Pediatric Nurse Practitioners®
NATIONAL ASSOCIATION OF

The Leader in Pediatric Education for Nurse Practitioners®

RESPIRATORY DISORDERS

Deena Garner, DNP, APRN, CPNP-PC

Disclosures

Deena Garner, DNP, APRN, CPNP-PC

- Has no financial relationship with commercial interests
- This presentation contains no reference to unlabeled/unapproved uses of drugs or products

Learning Objectives

Upon completion of this review, the course attendee should be able to:

- Describe the process of history and physical assessment of the respiratory system
- Distinguish between the pathophysiology, clinical presentation, evaluation, management, and follow-up of the most common respiratory disorders seen in primary care
- Implement current evidence-based guidelines to determine plan of care for common respiratory diagnoses seen in primary care.
- Describe education needs related to the most common respiratory disorders.

Pediatric Nurse Practitioners
The Leader in Pediatric Education for Nurse Practitioners

Respiratory Focused History of Present Illness

- History specific to respiratory complaint:
  - Promoting, preventing, precipitating, palliating factors
    - **Contacts**: those with similar illness ?
    - **Prevention**: medications, **immunizations**, supplements, handwashing
    - **Progression**: **increasing or decreasing in severity?**
    - **Treatment: what has been used? Is it helping?**
  - Quality or quantity of symptoms
    - **How severe are symptoms**?

Respiratory Focused History of Present Illness

- History specific to respiratory complaint:
  - **Region or radiation** ?
    - Complaints of chest pain
  - Severity, setting, simultaneous symptoms, similar illnesses in past?
    - **Key signs/symptoms/associated symptoms**
    - Similar illnesses
  - Temporal factors ?
    - **When did illness begin**?
    - **Acute or insidious onset : Spring time?, At school?, During PE?**
    - How long?

Respiratory Focused Physical Exam

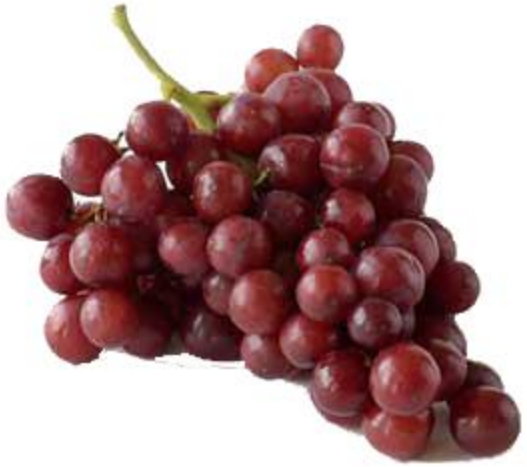
- Vital Signs/ General Appearance
- Abnormal Findings include:
  - Nasal flaring, skin color
  - Grunting, wheezing, stridor, accessory muscle use
  - Rhinorrhea
  - Dry or cyanotic MM
  - Lesions, vesicles, exudates within throat and pharynx
  - Tonsillar enlargement
  - Sinuses
  - Snoring
  - Crackles, rales, rhonchi, rattles, wheeze

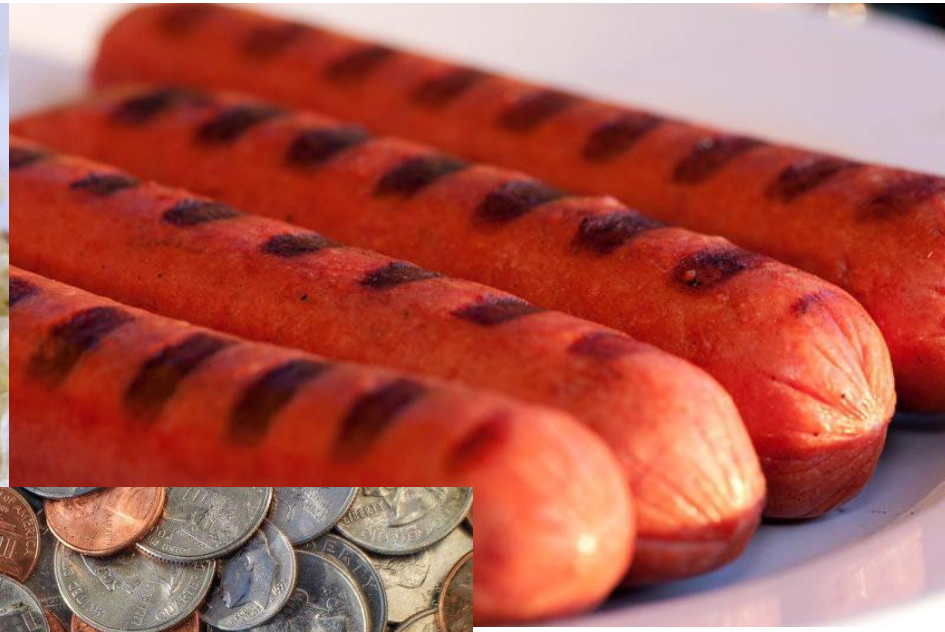
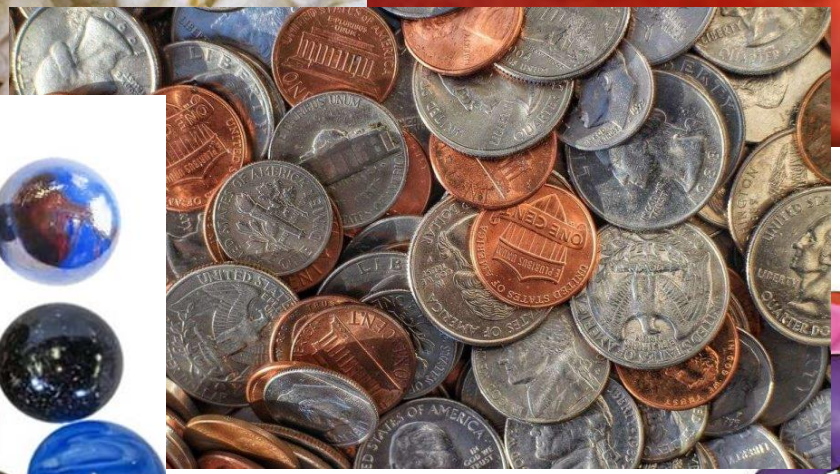
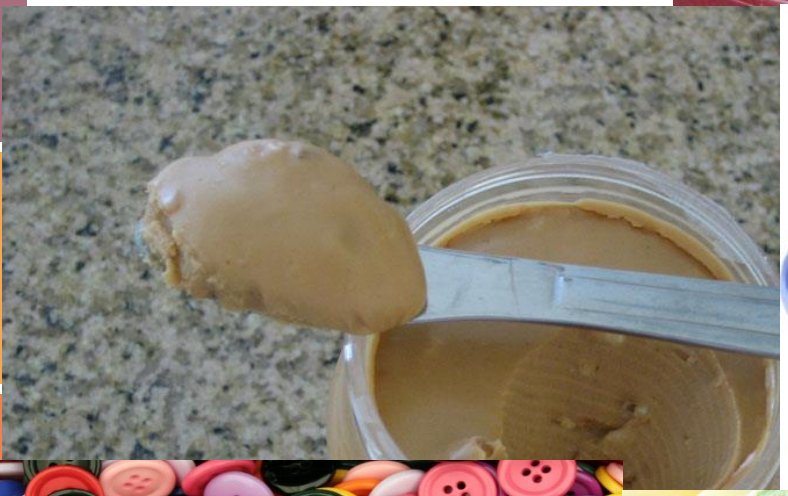
Foreign Body Aspiration

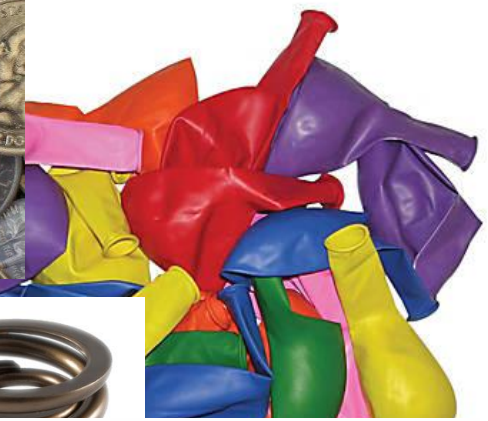
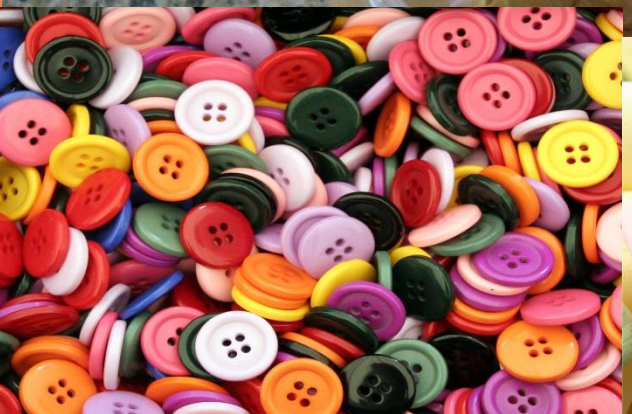
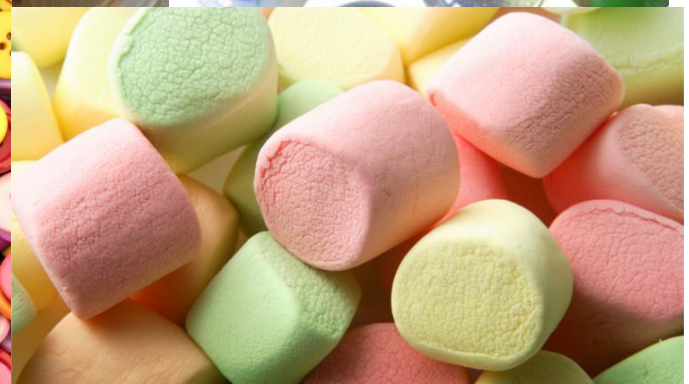
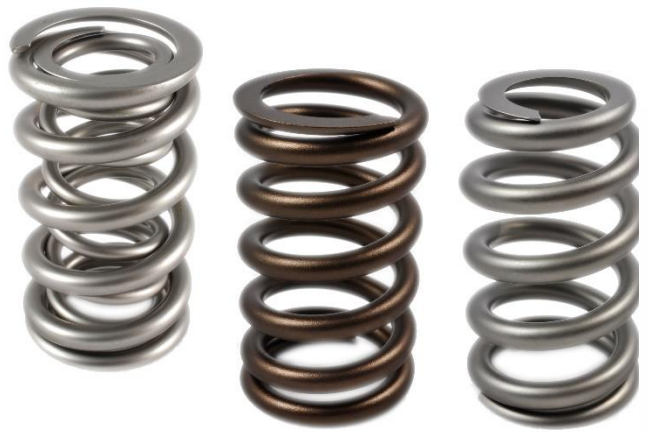
- Key Characteristics
- Laryngeal FB
  - Rapid onset of hoarseness/chronic croupy cough
  - **Unilateral wheezing**, recurrent pneumonia
- Tracheal FB
  - Brassy cough hoarseness, dyspnea, cyanosis
  - **Homophonic wheeze**
- Bronchial FB
  - **Most in right lung**

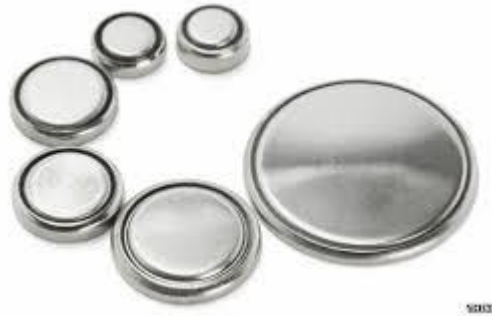
- S/S
  - ***Initial episode of coughing, gagging, choking***
  - *No s/s of respiratory infection*
  - Blood-streaked sputum
  - **Limited chest expansion, decreased vocal fremitus,** atelectasis
  - Crackles, rhonchi, wheezes
- Evaluation and Management
  - Pulse Ox
  - Inspiratory and expiratory CXRs
  - Referral to pulmonary specialist for bronchoscopy
  - Treat secondary lung infections, bronchospasm

Pediatric Nurse Practitioners
The Leader in Pediatric Education for Nurse Practitioners





Bronchiolitis

- Obstruction of the lower respiratory tract as a result of acute inflammation, edema, and necrosis of the epithelial cells of the small bronchioles

- Key Characteristics:
  - Viral illness, **primarily RSV**
  - **<24 months of age**
  - **Presents in late fall through early spring**

- S/S
  - URI symptoms: cough, coryza, rhinorrhea
  - Gradual development of respiratory distress
  - Low-grade to moderate fever
  - Decreased appetite
  - Coryza, conjunctivitis, pharyngitis, otitis media
  - **Tachypnea, substernal/intercostal retractions**
  - **Expiratory wheezing**, fine/coarse crackles
  - Varying respiratory distress

Pediatric Nurse Practitioners
The Leader in Pediatric Education for Nurse Practitioners

Bronchiolitis

- Evaluation:
  - History and physical examination alone can diagnose
  - RSV rapid antibody
  - CXR not indicated unless severe to rule out pneumonia
  - Routine virologic testing not recommended unless hospitalized

- Management
  - **EBP: no longer supports trial of bronchodilators**
  - Nebulized hypertonic saline for hospitalized infants
  - Antibiotics not used
  - **Supportive care: hydration, antipyretics**
  - Supplemental oxygen if low saturations
  - **Fluid intake monitoring**
    - **Smaller volumes more frequently**
  - Nasal suctioning; avoid deep airway suctioning
  - Close parental supervision
  - **Follow-up in 24 hours**

Pertussis

- Primary disease or reinfection – **whooping cough**
  - *Bordetella pertussis* – six species
- Key Characteristics:
  - **incubation 7-10 days (range from 5 to 21 days)**
  - **Usual source in infants is unrecognized infection in adult family members**
  - **inspiratory high pitched "whoop"**
  - **Classic cough lasts 6-10 weeks**

Pertussis

- S/S
  - **Manifestations vary by age, stage of disease, immunization status, antibodies**
  - Early- Stage: *Rhinorrhea, low grade temp, mild occasional cough*
  - Later-Stage
    - Infants: ***may*** have **cough "fits" with or without inspiratory high pitched "whoop"**
    - **Tachypnea**
    - **Poor feeding**
    - **Cyanosis** with feedings/coughing
    - **Vomiting during or after coughing fit**
    - **Apnea**
- Evaluation
  - Collection from nasopharynx
  - Organism found most frequently during catarrhal or early paroxysmal stage
- Management
  - **Macrolide antibiotics (Azithromycin)**
    - TMP-SMX as alternative
  - Corticosteroids, beta 2-adrenergic medications (not supported by evidence)

Pneumonia

- Key Characteristics:
  - **Lobar pneumonia: "typical" pneumonia:**
    - usually bacterial (10-20%)
  - Atypical pneumonia: **patterns of consolidation not localized:**
    - mycoplasma
  - **Viral pneumonia sets stage for bacterial pneumonia**
    - **most common** (70-80%)

- Infant
  - **Slower onset of respiratory symptoms**
- Child/adolescent
  - **History of mild URI, abrupt high fever, restlessness, shaking chills, apprehension, shortness of breath, malaise, pleuritic chest pain, vomiting**

Pneumonia

- S/S
  - Respiratory distress, apnea, tachycardia
  - Nasal flaring, grunting, retractions
  - Tachypnea, tachycardia, air hunger, cyanosis
  - **Fine crackles, dullness, diminished breath sounds**
- **Bacterial**
  - **Fever, hypoxia, lethargy**
  - **Splinting affected side, tachypnea, retractions**
  - **Pleural effusion**
- Viral
  - **Wheezing**
  - **Downward displacement of liver/spleen**
- Primary atypical
  - **Repetitive, staccato cough** – *C. trachomatis*

- **Evaluation:**
  - Chest x-ray
  - CBC with diff
  - Blood cultures if fails to improve
  - Rapid tests for viruses
- **Management**
  - Treat presumptively to cover bacterial pneumonia

Outpatient Setting	Presumed bacterial pneumonia	Presumed atypical pneumonia
• All patients	Amoxicillin, oral (90 mg/kg/day in 2 doses	Azithromycin oral (10 mg/kg on day 1, followed by 5 mg/kg/day once daily on days 2–5)

- Encourage fluids, use antipyretic/analgesic, avoid cough suppressants, teach parents s/s of respiratory distress and dehydration

Radiographic Findings of Some Bacterial Pneumonias	
H. Influenzae	Lobar consolidation
S. Pneumoniae	Lobar consolidation
Klebsiella	Lobar consolidation
Pneumocystitis (PCP)	Diffuse interstitial, alveolar, apical or upper lobe infiltrates “Ground Glass”
E. Coli	Patchy infiltrates, pleura effusion
Staphylococcus	Patchy infiltrates
Pseudomonas	Patchy infiltrates, cavitation

Question 1

What is the most common cause of atypical pneumonia in the pediatric population?

1. Mycoplasma
2. Staphylococcus aureus
3. Ureaplasma
4. Haemophilus influenza

Question 1

What is the most common cause of atypical pneumonia in the pediatric population?

Answer: Mycoplasma

Question 2

A mother brings her 4 month old to the office with fever, tachypnea, and decreased intake. The probable diagnosis and treatment include:

1. Bronchiolitis, Albuterol via Nebulizer at home
2. Bronchiolitis, Amoxicillin
3. Pneumonia, Albuterol
4. Bronchiolitis, Symptomatic treatment

Question 2

A mother brings her 4 month old to the office with fever, tachypnea, and decreased intake. The probable diagnosis and treatment include:

Answer: Bronchiolitis, Symptomatic treatment

Question 3

The most common clinical presentation of pneumonia includes:

1. Cough, fever, tachypnea, and abdominal pain
2. Hemoptysis, putrid breath, and weight loss
3. Sudden chest pain, cyanosis
4. Retractions, stridor

Question 3

The most common clinical presentation of pneumonia includes:

Answer: Cough, fever, tachypnea, and abdominal pain

Asthma

- Chronic inflammatory disorder of airways due to airflow ***obstruction, bronchial hyperresponsiveness, inflammation***
- Key Characteristics:
  - Absence of Fever
  - Wheezing
  - Breathlessness
  - Chest tightness
  - Dry, persistent cough, often nocturnal

Asthma

- S/S
  - Wheeze
  - Cough: Nocturnal and/or with exertion
  - ***Prolonged expiratory phase***
  - **Diminished breath sounds**
  - **Increased work of breathing/signs of distress**
  - *Vital signs (Decreased POx, Increased HR, Increased RR)*
  - Associated findings related to degree of exacerbation

Asthma

- Evaluation
  - Pulse oximetry at every assessment
  - Pulmonary function tests every 1-2 years or as needed
    - monitors response to therapy, variations in severity; helpful in EIA, acute episodes
  - **Peak flow measurements**
    - **The "Gold Standard"**
    - **Helps assess severity & reversibility of airflow obstruction and severity of asthma**

Asthma

- Management
  - Strategies based on classification and severity
    - **Stepwise approach**
  - Assess for compliance and “step up” if needed
    - **If well controlled 3 months, may “step down”**
    - Lowest possible dose of inhaled corticosteroids

- Pharmacological management
  - Gain control quickly – start at step of initial severity
  - Systemic corticosteroids may be needed at any time
  - Inhaled corticosteroids with LABA may be needed in some cases
  - Individualized asthma action plans are required
  - MDIs/**spacers** or nebulizers for β--agonist
  - Dry powder inhalers do not need spacers

Asthma

- **Pharmacologic treatment**
  - 2 Major Types:
    - Anti-inflammatory
    - Bronchodilators
  - 2 Major groups:
    - Quick-relief
    - Long-acting

- Quick-relief medications
  - Short-acting inhaled beta agonists
    - Albuterol, Proventil, Xopenex
  - Systemic corticosteroids – slower onset of action (up to 4 hours)
    - Prednisone (Orapred,Prelone)
- Long Acting medicaions
  - Long-acting beta2 agonists
    - Serevent
  - Combined meds
    - Advair
  - Leukotriene modifiers
    - Singulair
  - Inhaled corticosteroids *
    - Beclomethasone, Budesonide, Fluticasone, Flunisolide

Asthma

- **Patient and parent education and prevention**
  - Asthma, control, current level of symptoms
  - Environmental control
  - Different medications and how to use
  - Inhalers, spacers, nebulizers
  - How to identify symptoms indicating change in therapy/when to seek emergency care
  - **Home PEF or symptom monitoring**
  - **Written asthma action plan**
  - **Regular follow up**

- **Follow up:**
  - *If asthma is not well controlled:* Visits at 2- to 6-week intervals are recommended
  - *If asthma is well controlled:* Visits at 3- to 6-month intervals are recommended to monitor how well asthma control is maintained and to adjust medications as necessary

Pediatric Nurse Practitioners
The Leader in Pediatric Education for Nurse Practitioners

Question 4

A four year old, male comes to the office for routine well visit. Mom reports he uses his Albuterol twice a month with URI's. Sleeps well, no nocturnal cough. He has:

1. Moderate persistent asthma
2. Severe persistent asthma
3. Mild intermittent asthma
4. Mild persistent asthma

Question 4

A four year old, male comes to the office for routine well visit. Mom reports he uses his Albuterol twice a month with URI's. Sleeps well, no nocturnal cough. He has:

Answer: Mild intermittent asthma

Question 5

A six year old in the office using Albuterol every week has nocturnal cough and has just completed his second round of Orapred from Express Care visit this month. What would be the next step in the treatment plan per the NHLBI step-wise guidelines?

1. Begin low dose inhaled corticosteroids
2. Increase Albuterol to QID
3. Refer to Pulmonology
4. No change in treatment plan

Question 5

A six year old in the office using Albuterol every week has nocturnal cough and has just completed his second round of Orapred from Express Care visit this month. What would be the next step in the treatment plan per the NHLBI step-wise guidelines?

Answer: Begin low dose inhaled corticosteroids

Cystic Fibrosis

- Key Characteristics:
  - Most common autosomal recessive disorder in the Caucasian population.
    - Defective epithelial chloride transport
    - Airway surface liquid depletion= thick mucous
    - Defective mucociliary clearance
  - Increasing life expectancy (approx. 37 yo)

- Multisystem disorder: progressive obstructive pulmonary disease, recurrent respiratory infections, and GI disturbances.
  - **Skin tastes like salt**
  - **Frequent greasy stools**
  - **Poor growth**

Cystic Fibrosis

- S/S:
  - Neonatal: meconium ileus, prolonged jaundice, intestinal atresia
  - Infancy: cough, colonization of bacteria in mucus, bacterial pneumonia, FTT, hypoproteinemia, abdominal distension, cholestasis, rectal prolapse, steatorrhea, distal intestinal obstruction syndrome, hemolytic anemia
  - Childhood: polyps, steatorrhea, rectal prolapse, distal intestinal obstruction syndrome, hemolytic anemia
  - Adolescence: allergic bronchopulmonary aspergillosis, chronic pansinusitis, nasal polyposis, bronchiectasis, hemoptysis, idiopathic pancreatitis, osteoporosis

Cystic Fibrosis

- **Evaluation**
  - Newborn screening
  - Sweat Chloride test
  - Genetic analysis for CFTR mutation
- **Management**
  - Complicated treatment regimens managed with multidisciplinary team
    - Pulmonary, GI, Endocrine

Question 6

In addition to airway hyper-responsiveness and reversible airway obstruction, asthma is a chronic lung disease characterized by:

1. Bronchiectasis
2. Inflammation
3. Pleural effusion
4. Retractions, stridor

Question 6

In addition to airway hyper-responsiveness and reversible airway obstruction, asthma is a chronic lung disease characterized by:

Answer: Inflammation

Question 7

A child is being seen for wheezing. He has a history of asthma and is recovering from a viral illness. The parent reports the child has a “coughing fit” then started wheezing. Four (4) inhalations of Albuterol was give with no improvement of symptoms. On exam, the child is afebrile, responsive to questions, and + for unilateral wheezing. What is the most likely cause?

1. Croup
2. Asthma
3. Foreign body aspiration
4. Cystic fibrosis

Question 7

A child is being seen for wheezing. He has a history of asthma and is recovering from a viral illness. The parent reports the child has a “coughing fit” then started wheezing. Four (4) inhalations of Albuterol was give with no improvement of symptoms. On exam, the child is afebrile, responsive to questions, and + for unilateral wheezing. What is the most likely cause?

Answer: Foreign body aspiration