Adenovirus: manifestations — acute respiratory illness; epidemic keratoconjunctivitis; pharyngeal conjunctival fever; acute hemorrhagic cystitis; gastroenteritis; treatment — supportive care; studies have looked at cidofovir, ribavirin, and ganciclovir in immunocompromised patients; steroid drops may be helpful for adenovirus keratitis

Rhinovirus: symptoms — nasal congestion; sneezing; rhinorrhea; malaise; cough; sore throat; treatment — supportive care; counsel about rehydration, hand washing, and that fever may help inhibit infection

Croup: usually occurs in children between 6 and 36 mo of age (peaks at age 2 yr); causes — human parainfluenza virus (hPIV) types 1 and 3 most common; influenza viruses A and B; Mycoplasma and diphtheria infections; signs and symptoms — cough; low-grade fever; coryza; inspiratory stridor; wheezing generally absent; diagnosis — based on patient history and physical examination; rarely affects infants <3 mo of age; consider bacterial causes in patients with high-grade fever and toxic appearance; consider foreign body, angioedema, and retropharyngeal abscess in patients with stridor; treatment — supportive care; corticosteroids reduce laryngeal edema and decrease risk for hospitalization and intubation; single dose of steroids recommended in all cases; dexamethasone (0.15-0.60 mg/kg) treatment of choice ( lasts >72 hr); epinephrine can be considered for moderate to severe croup

Bronchiolitis: causes — respiratory syncytial virus (RSV) most common; human metapneumovirus; influenza virus; adenovirus, hPIV; signs and symptoms — in children <2 yr of age, symptoms of upper respiratory infection followed by tachypnea and wheezing; runny nose; cough; nasal flare and grunting; intercostal retractions; diagnosis — based on patient history and physical examination; laboratory or radiologic studies not routinely indicated; management — 2014 American Academy of Pediatrics (AAP) guidelines recommend against routine use of bronchodilators; bronchodilators can be continued if documented clinical response seen after first use; should not be routinely treated with corticosteroids (evidence insufficient); 2014 AAP guidelines recommend against routine use of ribavirin (consider for, eg, patients with severe RSV bronchiolitis and immunocompromise); use antibiotics only in children with specific indication of coexisting bacterial infection; chest physiotherapy no longer routinely recommended; give supplemental O2 therapy if O2 saturation rate <90%; children with congenital heart or lung disease, and preterm infants should also receive intramuscular (IM) palivizumab (Synagis; 15/mg/kg per month for 5 mo)

Parvovirus: patients often asymptomatic or have mild nonspecific cold-like symptoms; fifth disease — most recognizable presentation of parvovirus B19 infection; prodrome includes coryza, nausea, fever, and headache; “slapped-cheek” rash with circumoral pallor; after 1-5 days, children develop maculopapular rash on extremities and trunk (can last 1-6 wk); rash generally resolves without sequelae; arthropathy — in adults, proximal interphalangeal and metacarpophalangeal joints symmetrically involved; >80% of children have knee or ankle involvement; generally does not cause joint erosion and resolves in 3 wk; can last ≤ 6 mo in some women; gloves and socks syndrome — papular-purpuric, symmetric, painful, hand-and-foot erythema and edema; physical findings include sharp demarcation at wrists and ankles (skin above hands and feet generally unaffected); resolves in 1-3 wk; hydrops fetalis — transplacental infection of fetus; fetus most vulnerable during second trimester (fetus can develop severe anemia and myocarditis); in exposed pregnant women, check IgM antibodies or look for seroconversion using IgG and perform weekly or biweekly ultrasonography for next 10 to 20 wk; current guidelines do not recommend screening pregnant women for parvovirus

Diagnosis and treatment: if patient has erythema infectiosum, no further diagnostic testing needed; B19-specific antibody testing and viral DNA testing available; presence of giant pronormoblasts on peripheral blood smear suggests parvovirus; in patients with normal immune system, sensitivity of serum IgM testing ≥90% and specificity ≥99%; for patients with abnormal immune system or patients in transient aplastic crisis, gather viral DNA; in exposed pregnant women, check IgM antibodies or look for transplacental infection of fetus; patients with aplastic crisis need blood transfusion and higher acuity of care

Coxackievirus: member of enterovirus group; causes acute viral illness and oral vesicular eruptions in mouth, with involvement of hands, feet, buttocks, and genitalia; enterovirus A16 strain most often involved

Enterovirus 71: more likely to cause neurologic sequelae (eg, aseptic meningitis) and to be associated with vomiting; presentation — sore throat or mouth; malaise; mucular lesions of buccal mucosa develop into erosive vesicles with red or erythematous halo; fever (38°-39°C) for 24 to 48 hr; diagnosis — laboratory testing generally unnecessary; virus can be isolated by culture and immunosassay from cutaneous or mucosal lesions or stool; in more severe cases (with, eg, neurologic involvement), serotyping may be considered; outcomes worst in young infants; complications due to dehydration, electrolyte imbalance, or metabolic acidosis; symptoms protracted in immunocompromised children
**Otitis media (OM):** 2014 AAP diagnostic guidelines require moderate to severe bulging of tympanic membrane (TM), new-onset ear pain not due to otitis externa (OE), and mild bulge of TM associated with <48 hr of onset of ear pain or erythema; **OM with effusion**—middle ear effusion with lack of acute symptoms for acute OM (AOM)

**Treatment of AOM:** analgesics; important to treat children before sleep; ibuprofen preferred unless toxicity from acetaminophen likely; topical analgesics; antibiotics for infants <6 mo of age with severe symptoms (eg, moderate to severe ear pain, temperature of 102.2°F, ear pain lasting >48 hr) and children <2 yr of age with bilateral AOM, infants <2 wk of age with suspected AOM should receive full septic workup and antibiotic coverage for group B Streptococcus, Chlamydia, and gram-negative enterics; children 6 to 23 mo of age with unilateral AOM and mild symptoms can be observed; children >2 yr of age with mild symptoms and unilateral or bilateral AOM can be treated; 2 in 3 children recover from AOM without antibiotic use; American Academy of Family Physicians (AAFP) recommends against treatment of children 2 to 12 yr of age with nonsevere symptoms (observe and follow up); **antibiotic recommendations for AOM**—high-dose amoxicillin (80-90 mg/kg in divided doses); high-dose amoxicillin-clavulanate indicated for patients treated with amoxicillin in past 30 days, children with concomitant conjunctivitis, and patients who need cover for β-lactamase

Children with penicillin allergy: second- and third-generation cephalosporin (eg, cefuroxime) or single dose of TM or intravenous (IV) ceftriaxone can be used; 3-day injection course superior to 1-day injection; consider single high dose of azithromycin (30 mg/kg; consider resistance); trimethoprim-sulfamethoxazole no longer considered effective

**Otitis externa:** “swimmer’s ear”; 98% of cases caused by bacteria (eg, Pseudomonas, Staphylococcus aureus); consider malignant OE (invasion of surrounding soft tissue and bone) in older patients with diabetes mellitus; clinical diagnosis based on mild itching, edema, severe pain, external auditory canal (EAC) occlusion, and erythema, redness, and tenderness of pinna and tragus; pain correlates with disease severity; temperature >38.3°C indicates infection likely extending (consider malignant OE); **treatment**—topical antibiotic; topical corticosteroids (result in rapid symptom improvement); use of acetone acid alone may require 2 additional days past usual course of antibiotic treatment; NSAIDs and acetaminophen for pain; consider opioids for extreme cases; evidence insufficient to recommend benzocaine (may interact with antibiotic drops); if TM intact with no hypersensitivity, then neomycin-polymyxin-hydrocortisone combination generally considered first-line therapy; if TM not intact (or uncertain whether TM ruptured), or if patient may have reactions to aminoglycosides or allergies, ofloxacin or ciprofloxacin combined with dexamethasone approved for middle ear use; patients improve in 1 to 2 days with treatment; antibiotics given for 7 to 10 days (≤1 mo for extensive infection)

**Group A β-hemolytic streptococcal (GABHS) pharyngitis:** signs and symptoms—sudden onset of sore throat and temperature >38°C, prior exposure to Streptococcus in preceding 2 wk; anterior cervical nodes; pharyngeal tonsillar inflammation and exudate; cough, coryza, conjunctivitis, and diarrhea more likely with viral etiology; **Centor criteria**—1 pt for each criterion: absence of cough, presence of swollen or tender anterior cervical nodes, temperature >38°C, and tonsillar swelling or exudate; 1 pt for age 3 to 14 yr; subtract 1 pt if age >45 yr; if score 0 to 1, patient at low risk (no further screening or treatment required); if score 2 to 3, perform rapid antigen detection testing (RADT) or obtain throat culture (gold standard), and treat based on results; if score >4, treat empirically; AAP and Infectious Diseases Society of America recommend screening for Streptococcus or throat culture in all patients at risk, and that children receive routine backup throat culture when RADT negative (patients with positive Streptococcus screen or RADT should be treated)

**Treatment:** antibiotic therapy decreases symptom duration by ≥16 hr, prevents supplicative and nonsupplicative complications (eg, retropharyngeal abscess), and reduces spread of GABHS pharyngitis; oral penicillin B for 10 days; amoxicillin in children; penicillin G benzathine injection (single dose of 1.2 million units) for adults; in patients with penicillin allergy, oral erythromycin for 10 days or first-generation cephalosporin (if no immediate-type sensitivity to β-lactams) can be used

**Infectious mononucleosis:** Epstein-Barr virus (EBV) most common cause; symptoms—sore throat; fever; swollen tonsils; lymphadenopathy; fatigue; palatal petechiae; headaches; body aches; splenomegaly; rash; symptoms generally last 2 to 4 wk, but can last longer; **Hoagland criteria**—fever, pharyngitis, lymphadenopathy, and >50% lymphocytes and ≥10% atypical lymphocytes on complete blood cell count; confirmation with serologic testing; heterophile antibody by latex agglutination testing least sensitive in first 2 wk after infection, and less sensitive in children <12 yr of age; elevated transaminase levels seen in ≥50% of patients; IgG and IgM testing more commonly used (useful in patients with clinical findings suggestive of infectious mononucleosis and negative heterophile test results); EBV nuclear antigen testing (not detectable until 6-8 wk after infection); **management**—hydration; NSAIDs; acetaminophen; lidocaine throat spray, gargle, or throat lozenges; evidence on acyclovir or ranitidine limited; evidence insufficient to recommend steroids for symptom control; **considerations**—screen for Streptococcus; amoxicillin or ampicillin causes rash; risk for splenic rupture 0.1% (athletes should not participate in contact or collision sports for 3-4 wk after symptom onset; consider ultrasonography if symptoms last >8 wk)

**Acute diarrhea:** 75% to 90% of cases viral (eg, rotavirus); ≥3 watery or loose stools in 24 hr; cases lasting >14 days more likely to be parasitic; consider toxins in patients with neurologic changes; correcting dehydration critical; **treatment**—hydration; NSAIDs; acetaminophen; lidocaine throat spray, gargle, or throat lozenges; antibiotics decreased diarrhea duration by 1 day when used with rehydration supplements; antidiarrheals should be avoided; **management**—BRAT (bananas, rice, apple sauce, toast) diet no longer recommended; avoid water, soda, chicken broth, and apple juice; rehydration solution with 1:1 ratio of sodium to glucose recommended; premixed over-the-counter rehydration solution acceptable (10 mL/kg should be added for each loose stool or vomiting episode); ondansetron reduces need for admission and significantly decreases vomiting; IV fluids (20 mL/kg bolus with normal saline) and concomitant oral rehydration; monitor sodium levels and watch for hypoglycemia; Cochrane Review showed that probiotics decreased diarrhea duration by 1 day when used with rehydration supplements; multidrug regimens are no longer recommended; antibiotics decreased diarrhea duration by 1 day when used with rehydration supplements; antidiarrheals should be avoided; **rotavirus**—gastrointestinal symptoms resolve in 3 to 7 days; provide supportive care (no antiviral agents available); adequate hydration, control of fever and pain; children improve after 3 to 5 days; bowel lesions improve in 7 to 10 days

**Bronchitis:** cough primary symptom; pneumonia more likely with fever, tachypnea, tachycardia, and other lung findings; 90% of cases caused by viruses; routine serologic testing not indicated unless influenza suspected; consider Bordetella pertussis in patients with cough for >3 wk with known exposure or paroxysmal cough, or in unvaccinated patients; **treatment**—American College of Chest Physicians (ACCP) recommends against antibiotics for acute bronchitis; in patients with pertussis, consider macrolide; supportive treatment with antitussives, expectorants, β2 agonists; according to ACCP guidelines, no consistent evidence supports use of codeine, dextromethorphan, or hydrocodone (but can be helpful in chronic bronchitis); avoid cough or cold preparations in children <6 yr of age; expectorants not highly beneficial (may benefit wheezing patients); oral or inhaled steroids not thought to be useful; Pelargonium (geranium) associated with modest symptom relief
Pneumonia: causes include RSV, influenza A, and hPIV, S pneumoniae, Mycoplasma, and Chlamydia; S aureus and methicillin-resistant S aureus (MRSA) increasingly common; diagnosis — tachypnea (negative predictive value ≥98%; positive predictive value ≥20%); fever, retractions, nasal flare, crepitus, and grunting increases likelihood; chest x-rays can be useful, pleural effusion and lobar involvement more common with bacterial cause; outpatient treatment — for children 60 days to 5 yr of age, high-dose amoxicillin (80-90 mg/kg per day in 2 divided doses) for 7 to 10 days; in patients allergic to penicillin, options include azithromycin, clarithromycin, cefprozil, cefuroxime, or ceftriaxone (15 mg/kg in 1 IM dose); for children 5 to 16 yr of age, azithromycin (10 mg/kg per day on first day, then 5 mg/kg on days 2-5) recommended; admit infants <4 mo of age unless viral infection or Chlamydia trachomatis pneumonia obvious; consider admission in children with apnea, grunting, O2 saturation <92%, respiratory rate >70 breaths per min, and poor feeding; chest physiotherapy not useful in infants; inpatient treatment — for children 60 days to 5 yr of age, cefuroxime for 10 to 14 days; if child critically ill, erythromycin often added to cefuroxime; in children 5 to 16 yr of age, cefuroxime and erythromycin for 10 to 14 days, or cefuroxime and azithromycin for 5 days

Rotavirus vaccines: 2 available; Advisory Committee on Immunization Practices (ACIP) guidelines — maximum age for first dose 14 wk and 6 days; minimal interval between doses 8 wk; should not be started in infants >8 mo of age

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Suggested Reading

COMMON INFECTIONS AND THEIR PREVENTION

To test online, go to www.audiodigest.org and sign in to online services.
To submit a test form by mail or fax, complete Pretest section before listening and Posttest section after listening.

1. Which of the following viruses is the most common cause of croup?
   (A) Human parainfluenza virus (B) Enterovirus (C) Adenovirus (D) Bocavirus

2. Which of the following is routinely recommended for treatment of bronchiolitis?
   (A) Bronchodilators (B) Corticosteroids (C) Chest physiotherapy (D) None of the above

3. Choose the correct statement about parvovirus.
   (A) Fifth disease most recognizable presentation of parvovirus B19 infection (B) Associated arthropathy causes joint erosion (C) Gloves and socks syndrome resolves in 1 to 3 mo (D) Current guidelines recommend parvovirus screening for all pregnant women

4. Coxsackievirus infection most commonly causes an acute viral illness manifested by:
   (A) Sneezing and rhinorrhea (B) Hydrops fetalis (C) Oral vesicular eruptions in the mouth (D) Keratoconjunctivitis

5. Which of the following is no longer considered effective for treatment of otitis media?
   (A) Amoxicillin (B) Trimethoprim-sulfamethoxazole (C) Ceftriaxone (D) Azithromycin

6. Which of the following is first-line therapy for otitis externa in patients with an intact tympanic membrane and no hypersensitivity?
   (A) Acetaminophen (B) Benzocaine (C) Neomycin/polymyxin/hydrocortisone combination (D) Ciprofloxacin

7. When using Centor criteria for group A β-hemolytic streptococcal pharyngitis, 1 pt is subtracted for:
   (A) Absence of cough (B) Age >45 yr (C) Presence of swollen or tender anterior cervical nodes (D) Temperature >38°C

8. Which of the following therapies for symptoms of infectious mononucleosis is not adequately supported by data?
   (A) Hydration (B) Nonsteroidal anti-inflammatory drugs (NSAIDs) (C) Lidocaine throat lozenges (D) Corticosteroids

9. Which of the following should be avoided when treating acute diarrhea and dehydration?
   (A) Antidiarrheal agents (B) Premixed over-the-counter rehydration solution (C) Ondansetron (D) Probiotics

10. Which of the following has a 98% negative predictive value for pneumonia?
    (A) Intercostal retractions (B) Crepitis (C) Tachypnea (D) Apnea

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