

American Board of Family Medicine

Knowledge Assessment Questions: ASTHMA

Note: The order in which these questions are listed is the order in which they will be presented on a Diplomate's first time through the Knowledge Assessment. On subsequent visits to the assessment, the questions will be presented in groups organized by competency (content area).

1. An 18-year-old female presents to your office with a history of wheezing and year-round symptoms of rhinitis. She reports wheezing and coughing several times a week but rarely more than once a day, except in the last year, when she has had to intermittently use albuterol every day for a week at a time. She wakes up with nighttime cough weekly, without fever or other symptoms, and tells you this tends to scare her cat, who sleeps with her. Albuterol helps her symptoms temporarily. She has been treated with oral corticosteroids on three occasions this past year, most recently 6 weeks ago. Her Asthma Control Test score is 17. Pre- and post-bronchodilator spirometry results are shown below.

Initial testing

FVC.	2.0 L (80% of predicted)
FEV ₁	1.4 L (70% of predicted)
FEF 25–75.	1.5 L/sec (89% of predicted)

15 minutes post bronchodilator administration

FVC.	2.3 L (105% of predicted)
FEV ₁	2.0 L (100% of predicted)
FEF 25–75.	1.9 L/sec (100% of predicted)

Appropriate management at this time includes which of the following?
(Mark all that are true.)

- Initiation of inhaled formoterol (Foradil) and an inhaled corticosteroid
- Albuterol, (Proventil, Ventolin), 1–2 puffs as needed
- A discussion about removing the cat from her bedroom
- Follow-up in 2 months

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

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2. True statements regarding the use of long-acting β_2 -agonists in asthma include which of the following? (Mark all that are true.)
- They are useful for treating acute symptoms or exacerbations
 - They represent an alternative to inhaled corticosteroids in patients with persistent asthma
 - They provide a mild anti-inflammatory effect
 - They are beneficial when used in conjunction with inhaled corticosteroids
 - Salmeterol (Serevent) acts more rapidly than formoterol (Foradil)

Dutta EJ, Li JT: β -Agonists. *Med Clin North Am* 2002;86(5):991-1008.

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Lazarus SC, Boushey HA, Fahy JV, et al: Long-acting β_2 -agonist monotherapy vs continued therapy with inhaled corticosteroids in patients with persistent asthma: A randomized controlled trial. *JAMA* 2001;285(20):2583-2593.

Last Modified 01/06

3. A 14-year-old female presents to you with a recent history of cough and shortness of breath with exercise. Baseline pulmonary function testing reveals an FEV₁ of 3.1 L/min and a PEF of 600 L/min. Exercise testing is scheduled.

Which of the following measurements after exercise would support a diagnosis of exercise-induced bronchospasm? (Mark all that are true.)

- FEV₁ 2.8 L
- FEV₁ 2.5 L
- FEV₁ 2.2 L
- PEF 540 L/min

- PEF 525 L/min

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4. Agents associated with a dose-dependent reduction in bone mineral density include which of the following? (Mark all that are true.)

- Oral corticosteroids
- Inhaled corticosteroids
- Long-acting inhaled β_2 -agonists
- Leukotriene modifiers
- Theophylline

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Israel E, Banerjee TR, Fitzmaurice GM, et al: Effects of inhaled glucocorticoids on bone density in premenopausal women. *N Engl J Med* 2001;345(13):941-947.

Last Modified 02/05

5. Which one of the following is the most common acid/base abnormality in the early stages of an asthma exacerbation?

- A) Respiratory acidosis
- B) Respiratory alkalosis
- C) Metabolic acidosis
- D) Metabolic alkalosis
- E) Mixed respiratory alkalosis with metabolic acidosis

Higgins JC: The "crashing asthmatic." *Am Fam Physician* 2003;67(5):997-1004.

Last Modified 02/05

6. The mother of a 12-year-old male calls your office and tells you that over

the past few days he has had a low-grade fever, runny nose, and cough with yellowish phlegm. He has a history of mild persistent asthma (personal best peak flow 410 L/min) managed with a low-dose inhaled corticosteroid (ICS). She says that the previous evening he woke up in the middle of the night because of a coughing fit. She reports that his peak flow dropped to 270 L/min today (69% of personal best), but following two treatments 20 minutes apart with his short-acting β_2 -agonist his peak flow rose to 385 L/min (94% of personal best) and has been no lower than 330 L/min (80% of personal best) over the past 4 hours.

Which of the following should routinely be recommended in this situation? (Mark all that are true.)

- Continue the inhaled β_2 -agonist every 3–4 hours for the next 1–2 days
- Add an inhaled long-acting β_2 -agonist
- Double the dosage of the inhaled corticosteroid for 7–10 days
- Add an oral corticosteroid
- Start a 7-day course of amoxicillin

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7. Providing proper therapy for asthma requires an understanding of the mediators involved in the disease. Mediators linked to the pathophysiology of asthma include which of the following? (Mark all that are true.)

- Histamine
- Leukotrienes
- Granulocyte-macrophage colony-stimulating factor (GM-CSF)
- Interleukin-4 and interleukin-5
- Tissue necrosis factor- α

Busse WW, Lemanske RF Jr: Asthma. *N Engl J Med* 2001;344(5):350-362.

Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma-Update on selected topics 2002. National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, 2002, NIH pub no 02-5075.

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

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8. A 35-year-old male admitted to the intensive-care unit with a severe asthma exacerbation has failed to improve with aggressive bronchodilator therapy and systemic corticosteroid therapy. For the past 10 minutes he appears more fatigued, but less wheezing is heard and his pulsus paradoxus, which had been 30 mm Hg, is less than 10 mm Hg. His pO₂ is 60 mm Hg on high-dose oxygen therapy and his pCO₂ is 44 mm Hg.

Which one of the following interventions would be most appropriate?

- A) Intravenous β_2 -agonist therapy
- B) Intravenous magnesium sulfate
- C) Intravenous isoproterenol (Isuprel)
- D) Intubation and mechanical ventilation
- E) Heliox-driven albuterol nebulization

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Siwik JP, Nowak RM, Zoratti EM: The evaluation and management of acute, severe asthma. *Med Clin North Am* 2002;86(5):1049-1071.

Last Modified 02/05

9. True statements regarding written asthma action plans include which of the following? (Mark all that are true.)
- They should be used in patients with moderate or severe persistent asthma
 - They should be used in patients with a history of severe exacerbations
 - They should be used in patients whose perception of airflow obstruction is poor

- The lack of a written asthma action is a risk factor for death from asthma
- Peak-flow-based asthma action plans are more effective than symptom-based plans

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10. Which one of the following has been found to be the most effective in reducing the frequency of exacerbations in adults with asthma?
- A) Inhaled corticosteroids
 - B) Leukotriene modifiers
 - C) Long-acting β_2 -agonists
 - D) Monoclonal anti-IgE antibodies
 - E) Nedocromil

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Sin DD, Man J, Sharpe H, et al: Pharmacologic management to reduce exacerbations in adults with asthma: A systematic review and meta-analysis. *JAMA* 2004;292(3):367-376.

Last Modified 01/06

11. True statements regarding aspirin-induced asthma include which of the following? (Mark all that are true.)
- It is often associated with perennial vasomotor rhinitis
 - It is associated with rhinosinusitis and nasal polyps
 - Salsalate is a safe alternative to aspirin
 - Ibuprofen is a safe alternative to aspirin
 - Leukotriene modifiers are particularly effective

Drazen JM, Israel E, O'Byrne PM: Treatment of asthma with drugs modifying the leukotriene pathway. *N Engl J Med* 1999;340(3):197-206.

12. A 22-year-old male with long-standing asthma develops a severe asthma exacerbation following an upper respiratory infection. He is seen in the emergency department with severe dyspnea and a fall in peak flow to 270 L/min (45% of personal best). His personal best peak flow is 600 L/min. He is hospitalized and aggressively treated with short-acting β_2 -agonists, plus oral prednisone, 40 mg/day. He responds to therapy and his peak flow rises to 340 L/min (57% of personal best).

Discontinuation of oral corticosteroid therapy should be considered in this patient if the peak flow rate rises above a threshold of

- A) 360 L/min
- B) 400 L/min
- C) 480 L/min
- D) 600 L/min

13. A 25-year-old obese female with a history of moderate persistent asthma continues to have problems with frequent nighttime awakening and daytime wheezing despite treatment with a medium-dose inhaled corticosteroid and a leukotriene receptor antagonist.

Identification and treatment of which of the following chronic comorbid conditions can improve asthma management?

- Allergic rhinitis
- Allergic bronchopulmonary aspergillosis
- Obstructive sleep apnea
- Gastroesophageal reflux disease

14. Which one of the following allergens is likely responsible for the disproportionately high morbidity from asthma among inner-city residents?
- A) House dust mite allergen
 - B) Cockroach allergen
 - C) Cat dander
 - D) Dog dander
 - E) Mold spores

Rosenstreich DL, Eggleston P, Kattan M, et al: The role of cockroach allergy and exposure to cockroach allergen in causing morbidity among inner-city children with asthma. *N Engl J Med* 1997;336(19):1356-1363.

Last Modified 02/05

15. A 24-year-old male with mild persistent asthma treated with a low-dose inhaled corticosteroid sees you for a follow-up visit. He reports that his cough and wheezing have improved, but that he continues to require the use of an albuterol HFA (Proventil, Ventolin) inhaler 3–4 times a week. He notes that he did not require the use of albuterol even once during a recent 1-week vacation in Maui. Office spirometry is normal. His serum IgE level is 130 IU/mL (N 6–97).

Which of the following options would be most appropriate? (Mark all that are true.)

- Discontinue the corticosteroid and begin omalizumab (Xolair)
- Add ipratropium HFA (Atrovent)
- Assess the patient for exposure to inhalant allergens
- Ask the patient about exposure to tobacco smoke and other irritants
- Review medication adherence

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16. A 22-year-old female with mild persistent asthma informs you that she and her husband have decided to have a baby. Which one of the following asthma agents would be preferred?
- A) Inhaled corticosteroids
 - B) Inhaled cromolyn
 - C) Oral theophylline
 - D) An oral leukotriene receptor antagonist
 - E) A long-acting inhaled β_2 -agonist

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Quick reference from the working group report on managing asthma during pregnancy: Recommendations for pharmacologic treatment—2004 update. National Heart, Lung, and Blood Institute, 2005, NIH pub no 05-2546.

Last Modified 02/07

17. Which one of the following is LEAST likely to precipitate bronchospasm in a patient with exercise-induced asthma?
- A) Swimming in a heated indoor pool
 - B) Ice skating
 - C) Cross-country skiing
 - D) Ice hockey
 - E) Running outdoors

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18. A 4-year-old female is diagnosed with mild persistent asthma. Which one of the following is preferred for long-term control?
- A) Low-dose inhaled corticosteroids
 - B) Inhaled cromolyn (NasalCrom)
 - C) Inhaled nedocromil (Tilade)
 - D) A leukotriene modifier
 - E) Sustained-release theophylline (T-Phyl)

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19. For which of the following ethnic groups are long-acting inhaled β -agonists felt to be less effective?
- A) Hispanics
 - B) Caucasians
 - C) African-Americans
 - D) Asians
 - E) Native American

Glassroth J: The role of long-acting β -agonists in the management of asthma: Analysis, meta-analysis, and more analysis. *Ann Intern Med* 2006;144(12):936-937.

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Sin DD, Man J, Sharpe H, et al: Pharmacologic management to reduce exacerbations in adults with asthma: A systematic review and meta-analysis. *JAMA* 2004;292(3):367-376.

Last Modified 02/07

20. List five causes of cough and wheezing other than asthma in infants and young children.
- A) _____

- B) _____
- C) _____
- D) _____
- E) _____

Guidelines for the Diagnosis and Management of Asthma: Expert Panel Report 2. National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, 1997, NIH pub no 97-4051.

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Last Modified 01/06

21. Inhaled corticosteroids have been shown to provide which of the following benefits in patients with asthma? (Mark all that are true.)

- Reduced severity of symptoms
- Improved pulmonary function
- Reduced airway hyperresponsiveness
- Fewer exacerbations
- Prevention of airway wall remodeling

Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma-Update on selected topics 2002. National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, 2002, NIH pub no 02-5075.

Guilbert TW, Morgan WJ, Zeifer RS, et al: Long-term inhaled corticosteroids in preschool children at high risk for asthma. *N Engl J Med* 2006;354(19):1985-1997.

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Last Modified 02/05

22. Nonpharmacologic measures that reduce the likelihood of exercise-induced bronchospasm include which of the following? (Mark all that are true.)

- Warming up for at least 10 minutes before actual exercise begins

- Breathing through the mouth
- Covering the mouth and nose with a scarf or mask during cold weather
- Gradually decreasing the intensity of the exercise before stopping

Guidelines for the Diagnosis and Management of Asthma: Expert Panel Report 2. National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, 1997, NIH pub no 97-4051.

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Sinha T, David AK: Recognition and management of exercise-induced bronchospasm. *Am Fam Physician* 2003;67(4):769-774,776.

Last Modified 01/06

23. Helpful measures in the management of asthma in patients sensitive to house-dust-mite allergen include which of the following? (Mark all that are true.)
- Encasing pillows and mattress in an allergen-impermeable cover
 - Washing sheets and blankets weekly in hot water (54°C, or 130°F)
 - Regular use of a humidifier
 - Vacuuming carpets once or twice a week, using a vacuum cleaner fitted with a HEPA (High Efficiency Particulate Air) filter or double bag
 - Regular use of an indoor air-filtering device

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24. The use of long-acting β -agonists has been associated with an increased risk for
- A) hyperkalemia
 - B) hypoglycemia
 - C) cataracts

- D) severe asthma exacerbations
- E) pulmonary fibrosis

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

FDA Drug Safety Communication: New safety requirements for long-acting inhaled asthma medications called long-acting beta-agonists (LABAs). US Food and Drug Administration, 2010.
Last Modified 01/06

25. Useful agents for the management of acute severe asthma exacerbations in the emergency department setting include which of the following? (Mark all that are true.)

- Albuterol (Ventolin, Proventil)
- Levalbuterol (Xopenex)
- Ipratropium bromide (Atrovent)
- Systemic corticosteroids
- Methylxanthines

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26. Which one of the following is LEAST effective for preventing exercise-induced bronchospasm?

- A) Inhaled albuterol (Proventil)
- B) Nedocromil (Tilade)
- C) Formoterol (Foradil)
- D) Zafirlukast (Accolate)
- E) Ipratropium (Atrovent)

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Sinha T, David AK: Recognition and management of exercise-induced bronchospasm. *Am Fam Physician* 2003;67(4):769-774,776.

Last Modified 01/06

27. Long-term adverse effects of chronic low- to medium-dose inhaled corticosteroid use in children include which of the following?
- A permanent reduction in vertical growth
 - A reduction in bone mineral density
 - Cataract formation
 - Glaucoma
 - None of the above

Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma-Update on selected topics 2002. National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, 2002, NIH pub no 02-5075.

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

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28. A 26-year-old male with asthma is seen in the emergency department. He is short of breath and has diminished breath sounds with an occasional wheeze heard on examination. His FEV₁ is 15% of predicted and his PaCO₂ is 40 mm Hg. He is given albuterol (Proventil, Ventolin) via nebulizer every 20 minutes, and after 1 hour his FEV₁ has improved to 20% of predicted.

The development of which of the following would be consistent with imminent respiratory failure? (Mark all that are true.)

- A drop in pCO₂ to 32 mm Hg
- The use of accessory muscles with suprasternal retractions
- Bradycardia
- Pulsus paradoxicus of 15 mm Hg
- The absence of wheezes

29. You see a 14-year-old female for a routine annual visit. She has a history of episodic wheezing in the past treated with inhaled albuterol (Proventil, Ventolin) as needed. She tells you that she uses her inhaler less than once a week and rarely develops nighttime wheezing. Her FEV₁ is 90% of predicted. She reports that at least twice during the past year she had a persistent cough and wheezing which required urgent care visits and was placed on a short course of oral corticosteroids.

Which one of the following would be the preferred treatment for her asthma?

- A) Continuation of the current management
- B) Continued use of albuterol as needed, plus an inhaled long-acting β_2 -agonist at bedtime
- C) Continued use of albuterol as needed, plus oral sustained-release theophylline (T-Phyl) at bedtime
- D) Adding a low-dose inhaled corticosteroid
- E) Inhaled nedocromil (Tilade)

30. Risk factors for death from asthma include which of the following? (Mark all that are true.)
- An emergency care visit for asthma during the past month
 - Use of 1 canister per month of an inhaled short-acting β_2 -agonist
 - Lack of a written asthma action plan
 - Difficulty perceiving asthma symptoms
 - Illicit drug use

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31. True statements regarding allergic bronchopulmonary aspergillosis include which of the following? (Mark all that are true.)
- The associated bronchial asthma arises from colonization with *Aspergillus fumigatus*
 - It is associated with transient, recurrent infiltrates on chest radiographs
 - It is associated with central bronchiectasis on a high-resolution chest CT scan
 - Diagnostic criteria include the presence of serum IgG to *Aspergillus*
 - It should be considered in patients with severe asthma refractory to treatment

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Stevens DA, Moss RB, Kurup VP, et al: Allergic bronchopulmonary aspergillosis in cystic fibrosis State of the art: Cystic Fibrosis Foundation Consensus Conference. *Clin Infect Dis* 2003;37(Suppl 3):S225-S264.

Last Modified 08/07

32. True statements regarding the use of systemic corticosteroids in the management of asthma exacerbations include which of the following? (Mark all that are true.)
- They reduce the rate of relapse
 - A "burst" dose of 20–30 mg/day (0.5 mg/kg/day in children) for 3–10 days is recommended to rapidly gain control of inadequately controlled persistent asthma
 - Short-term therapy should be continued until the patient achieves at least 70% of his or her personal best peak expiratory flow, or until symptoms resolve
 - Tapering the dose following asthma improvement is routinely recommended to prevent a relapse in asthma exacerbations

- Intravenous corticosteroids are more effective than oral corticosteroids

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33. Extrinsic IgE-mediated allergy can serve as a trigger for asthma. Which one of the following can reduce corticosteroid requirements in asthmatics by reducing free circulating IgE?
- A) Omalizumab (Xolair)
 - B) Dapsone
 - C) Formoterol (Foradil)
 - D) Ondansetron (Zofran)
 - E) Zafirlukast (Accolate)

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Milgrom H, Fick RB Jr, Su JQ, et al: Treatment of allergic asthma with monoclonal anti-IgE antibody. rhuMAB-E25 Study Group. *N Engl J Med* 1999;341(26):1966-1973.

Last Modified 01/06

34. A 48-year-old male presents with a 3-week history of exertional chest pressure. He has moderate persistent asthma controlled with a moderate dose of an inhaled corticosteroid.

Which of the following cardiac stress tests should be avoided?

- Dobutamine echocardiography
- Adenosine myocardial perfusion imaging
- Dipyridamole myocardial perfusion imaging
- Exercise myocardial perfusion imaging
- Exercise echocardiography

Gibbons RJ, Abrams J, Chatterjee K, et al: ACA/AHA 2002 Guideline Update for the Management

of Patients with Chronic Stable Angina: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Committee to Update the 1999 Guidelines for the Management of Patients With Chronic Stable Angina. American College of Cardiology/American Heart Association, 2002, pp

Last Modified 02/05

35. Adjunctive therapies generally felt to be of value in the management of severe asthma exacerbations in the adult patient include which of the following? (Mark all that are true.)

- Heliox-driven albuterol nebulization
- Chest physical therapy
- Mucolytic therapy
- Aggressive hydration
- Intravenous magnesium sulfate

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36. Adverse effects associated with the use of β_2 -agonists include which of the following? (Mark all that are true.)

- Tremor
- Tachycardia
- Hypoglycemia
- Hyperkalemia
- A temporary reduction in arterial oxygen tension

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37. While some facets of asthma are reversible, changes seen in chronic, uncontrolled asthma may be irreversible. Histologic features of the

irreversible airway remodeling seen in patients with chronic asthma include which of the following? (Mark all that are true.)

- Goblet cell hyperplasia
- Subepithelial collagen deposition
- Smooth muscle hypertrophy
- Microvascular proliferation

Hallstrand TS, Henderson WR Jr: Leukotriene modifiers. *Med Clin North Am* 2002;86(5):1009-1033.

Jarjour NN, Kelly EA: Pathogenesis of asthma. *Med Clin North Am* 2002;86(5):925-936.
Last Modified 02/05

38. True statements regarding exercise-induced bronchospasm include which of the following? (Mark all that are true.)

- It is not commonly seen in patients with persistent asthma
- It occurs during or in the minutes following vigorous physical activity
- It usually peaks 5–10 minutes into the activity
- It typically does not resolve until several hours after the activity
- The differential diagnosis includes vocal cord dysfunction

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39. True statements regarding leukotriene modifiers include which of the following? (Mark all that are true.)

- They can be used as quick-relief asthma agents
- They are effective for managing exercise-induced asthma
- They are contraindicated in patients with aspirin-sensitive asthma
- They are less effective than inhaled corticosteroids

- They can be substituted for an inhaled corticosteroid in patients taking long-acting β_2 -agonists

Drazen JM, Israel E, O'Byrne PM: Treatment of asthma with drugs modifying the leukotriene pathway. *N Engl J Med* 1999;340(3):197-206.

Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma-Update on selected topics 2002. National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, 2002, NIH pub no 02-5075.

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40. True statements regarding inhaled corticosteroids (ICs) include which of the following? (Mark all that are true.)

- The full benefit is generally seen within 2–3 weeks
- A spacer/holding chamber should routinely be used with aerosol preparations to reduce the risk for local adverse effects
- Increasing the dosage of low-dose ICs produces a greater benefit in persistent asthma than adding a long-acting β_2 -agonist
- They have a linear dose-response

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41. A 28-year-old male with a history of moderate persistent asthma presents to the emergency department with a 2-day history of worsening dyspnea despite frequent dosing with his inhaled β_2 -agonist. Examination reveals a restless patient with a respiratory rate of 35/min, obvious suprasternal retractions, and loud inspiratory and expiratory wheezes. His FEV₁ is 1.6 L (48% of predicted) and his peak flow is 250 L/sec (49% of personal best). His oxygen saturation is 89%.

Which of the following management options would be appropriate? (Mark all that are true.)

- Oxygen therapy

- Inhaled high-dose β_2 -agonist therapy
- Systemic corticosteroid therapy
- An inhaled anticholinergic agent
- Intravenous isoproterenol (Isuprel)

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Siwik JP, Nowak RM, Zoratti EM: The evaluation and management of acute, severe asthma. *Med Clin North Am* 2002;86(5):1049-1071.

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42. Validated tools for ongoing clinical assessment of asthma control include which of the following? (Mark all that are true.)

- Asthma Therapy Assessment Questionnaire (ATAQ)
- Asthma Control Test (ACT)
- Asthma Control Questionnaire (ACQ)
- Asthma Control Score (ACS)
- SF-10 for Asthma

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Pollart SM, Elward KS: Overview of changes to asthma guidelines: Diagnosis and screening. *Am Fam Physician* 2009;79(9):761-767.

Last Modified 05/10

43. The most effective medication for long term management of persistent asthma is

- A) inhaled corticosteroids
- B) leukotriene modifiers
- C) long-acting β -agonists

- D) albuterol
- E) immunotherapy

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44. A 19-year-old male has severe persistent asthma treated with high-dose inhaled corticosteroids (ICS) and a long-acting inhaled β_2 -agonist. For the past few months he has experienced daily wheezing and is using his albuterol inhaler several times per day. His past medical history is notable for a history of perennial allergic rhinitis related to cockroach allergy.

According to 2007 NAEPP guidelines, which one of the following adjunctive therapies would most likely be of benefit?

- A) Theophylline
- B) A leukotriene receptor antagonist
- C) Omalizumab (Xolair)
- D) Zileuton (Zyflo)
- E) Subcutaneous allergen immunotherapy

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45. Following bronchodilator inhalation, the minimum improvement in FEV₁ or FVC consistent with reversibility is

- A) 10% (absolute increase 200 mL)
- B) 12% (absolute increase 200 mL)
- C) 15% (absolute increase 160 mL)
- D) 20% (absolute increase 250 mL)
- E) 30% (absolute increase 250 mL)

46. A 15-year-old male has mild persistent asthma managed with zafirlukast (Acculate). At a routine visit he reports that over the past 2 months he has been wheezing 3–4 days of the week and has been awakened at night by his asthma twice a week. His peak flow is found to be 400 L/min (75% of his personal best).

Which of the following interventions would be appropriate at this visit? (Mark all that are true.)

- Review his adherence to his medication regimen
- Assess his environment for new or increased exposure to allergens or irritants
- Identify psychosocial issues which might adversely affect his asthma
- Identify comorbid conditions that can diminish asthma control
- Discontinue zafirlukast and switch to a low-dose inhaled corticosteroid

47. A 22-year-old female presents to the emergency department with a severe asthma attack. Examination reveals a severely dyspneic female with diffuse inspiratory and expiratory wheezing, use of accessory muscles, pulsus paradoxus of 30 mm Hg, and a pulse of 110 beats/min. Her peak expiratory flow is found to be 150 L/min, her pO₂ is 60 mm Hg, and her pCO₂ is 30 mm Hg.

Aggressive asthma treatment with inhaled β_2 -agonists and systemic corticosteroids is instituted, and she is reevaluated 1 hour later. Which one of the following would provide the most reassurance that she is responding to therapy?

- A) The absence of wheezing
- B) A reduction in pulsus paradoxus

- C) A pCO₂ of 40 mm Hg
- D) A PEF of 300 L/min
- E) Inward movement of the abdomen with inspiration

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Siwik JP, Nowak RM, Zoratti EM: The evaluation and management of acute, severe asthma. *Med Clin North Am* 2002;86(5):1049-1071.

Last Modified 02/05

48. A 6-year-old male with a past history of "reactive airway disease" has a 2-month history of cough and wheezing 3–4 times per week requiring treatment with his albuterol (Proventil, Ventolin) inhaler. He also has had nighttime awakening with cough and wheezing slightly less than once a week. Office spirometry reveals an FEV₁ that is 85% of predicted.

Appropriate treatment options include which of the following? (Mark all that are true.)

- A low-dose inhaled corticosteroid
- A long-acting inhaled β₂-agonist
- A leukotriene receptor antagonist
- Theophylline
- Nedocromil (Tilade)
- Omalizumab (Xolair)

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Last Modified 05/10

49. A 25-year-old female with a history of mild persistent asthma presents to the emergency department for a 5-day history of increasing cough, wheezing, and shortness of breath. On examination, she is noted to be slightly agitated with a pulse rate of 110 beats/min. Examination of the lungs reveals loud expiratory wheezing on auscultation and obvious suprasternal retractions. Her FEV₁ is 1.71 L (63% of predicted) and her

oxygen saturation is 92%.

Which of the following treatment interventions would you initially prescribe? (Mark all that are true.)

- Intubation
- An inhaled short-acting β_2 -agonist, up to 3 treatments in the first hour
- Intravenous theophylline
- Oxygen by mask
- Oral corticosteroid therapy

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Siwik JP, Nowak RM, Zoratti EM: The evaluation and management of acute, severe asthma. *Med Clin North Am* 2002;86(5):1049-1071.

Last Modified 05/06

50. A 2-year-old male is brought to your office because of a cough and wheezing. His mother states that on at least four other occasions during the past year he has experienced episodes of wheezing precipitated by "colds."

Risk factors for developing persistent asthma would included which of the following? (Mark all that are true.)

- A parental history of asthma
- A previous history of atopic dermatitis
- Evidence of sensitization to aeroantigens
- Elevated IgE levels
- Improvement of wheezing with use of a β_2 -agonist

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51. True statements regarding bronchoprovocative testing include which of the following? (Mark all that are true.)

- Histamine is the most commonly used bronchoprovocative agent
- A positive test is defined as a 12% decline in FEV₁ following a challenge
- A positive test is diagnostic of asthma
- A negative test is helpful in excluding the diagnosis of asthma
- Testing is not recommended in patients with a baseline FEV₁ less than 65% of predicted

Crapo RO, Casaburi R, Coates AL, et al: Guidelines for methacholine and exercise challenge testing-1999. *Am J Respir Crit Care Med* 2000;161(1):309-329.

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Wubbel C, Asmus MJ, Stevens G, et al: Methacholine challenge testing: Comparison of the two American Thoracic Society-recommended methods. *Chest* 2004;125(2):453-458.

Last Modified 01/06

52. A 15-year-old asthmatic male presents with an episodic cough and wheezing. He reports wheezing episodes 3–5 days per week and nighttime awakenings no more than 3 times a month. He states that 6 months ago he had to go to an urgent care center for an upper respiratory infection with a severe cough, which was treated with an asthma inhaler and some "oral medication for a few days." His FEV₁ is 70% of predicted.

This patient has

- A) mild intermittent asthma
- B) moderate intermittent asthma
- C) mild persistent asthma
- D) moderate persistent asthma
- E) severe persistent asthma

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53. A 32-year-old patient has a history of moderate persistent asthma treated with a medium-dose inhaled corticosteroid. Over the past 3 months he has awakened with a cough once or twice a month and has required the use of his albuterol inhaler once a week. Once in the past year he had an exacerbation which required the use of an oral corticosteroid. His peak flow periodically drops as low as 540 L/min, down from a personal best of 600 L/min.

Which one of the following would be most appropriate?

- A) No change in drug therapy
- B) Adding a long-acting inhaled β_2 -agonist to his regimen
- C) Adding a leukotriene-receptor antagonist to his regimen
- D) Adding theophylline to his regimen
- E) A short course of an oral corticosteroid

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Last Modified 02/08

54. True statements regarding occupational asthma include which of the following?

- The likelihood of complete resolution decreases with time of exposure to the sensitizer
- Continued symptoms during weekends away from work excludes the diagnosis
- The onset of symptoms may occur after a high-level exposure (e.g., a spill)
- Symptoms can occur 2–8 hours after exposure
- Serial measurement of peak expiratory flow rates at work and away from work is helpful in the diagnostic evaluation

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Last Modified 02/05

55. Physical findings consistent with airway obstruction in a patient with uncomplicated asthma include which of the following? (Mark all that are true.)
- Clubbing
 - Expiratory wheezing
 - A shortened expiratory phase
 - Distant breath sounds
 - Hyperresonance of the thorax on percussion

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Last Modified 01/06

56. True statements about written asthma action plans include which of the following? (Mark all that are true.)
- They are recommended for all patients with asthma, regardless of severity
 - They have been shown to reduce hospitalizations and emergency department visits when used in the context of an asthma self-management program
 - Medication adjustments by patients using a written asthma action plan are likely to be less effective than changes by a physician during an office visit
 - They are of particular value for patients who have moderate or severe persistent asthma, a history of severe exacerbations, or poorly controlled asthma

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Last Modified 05/10

57. A 17-year-old male reports that his asthma is usually worse in the early spring. Which one of the following is most likely triggering his symptoms at this time of year?
- A) Tree pollens
 - B) Grass pollen
 - C) Weed pollens
 - D) *Alternaria*
 - E) Mites

Guidelines for the Diagnosis and Management of Asthma: Expert Panel Report 2. National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, 1997, NIH pub no 97-4051.

Last Modified 01/06

58. The mother of a 15-year-old female with a history of moderate persistent asthma calls your office and tells you that over the past few days the girl has experienced rhinorrhea and cough with growing dyspnea. Her asthma is treated with medium-dose inhaled corticosteroids and a long-acting β_2 -agonist and the problem has developed even though she has used her β_2 -agonist MDI four times a day. The mother reports that the daughter's peak flow late this morning was 310 L/min (61% of personal best) and that her personal best prior to the illness was 510 L/min. Following two treatments with her albuterol (Proventil, Ventolin) inhaler at 20-minute intervals, her wheezing improved and her peak flow rose from 310 L/min (61% of personal best) to 360 L/min (71% of personal best).

Which of the following would you recommend? (Mark all that are true.)

- Continue current management
- Continue use of the albuterol inhaler every 3–4 hours for 24–48 hours
- Double the dosage of the inhaled corticosteroid
- Start oral prednisone at a dosage of 1–2 mg/kg/day
- Initiate mucolytic therapy

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National

Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Last Modified 02/05

59. A 29-year-old female at 32 weeks gestation presents with a 3-day history of increasing wheezing and dyspnea. She has a history of asthma since childhood.

Which one of the following pCO₂ levels is the threshold for respiratory failure in this patient?

- A) 25 mm Hg
- B) 35 mm Hg
- C) 45 mm Hg
- D) 55 mm Hg
- E) 65 mm Hg

Moses S: Asthma in pregnancy. *Family Practice Notebook.com*. 2005.

Last Modified 02/07

60. Foods that should be avoided by patients with persistent asthma who have a known sulfite sensitivity include which of the following? (Mark all that are true.)

- Processed potatoes
- Wine
- Dried fruit
- Beer
- Shrimp

Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, NIH pub no 07-4051, 2007.

Nelson HS: Allergen and irritant control: Importance and implementation. *Clinical Cornerstones* 1998;1(2):57-66.

Last Modified 02/05

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Version 03.01.07
Last modified 05/10