

NAECB Practice Exam

1. An asthma episode includes which of the following criteria?

- a. Mucus production
- b. Fever
- c. Rhinitis
- d. Gastroesophageal reflux disease (GERD)

2. Which of the following are considered inhaled irritants?

- a. Pet dander and cleaning sprays
- b. Perfumes and tree pollen
- c. Leaf smoke and air fresheners
- d. Cigarette smoke and dust mites

3. What is the mechanism of action for short-acting bronchodilators?

- a. Prevention of the release of histamine
- b. Prevention of the release of leukotrienes
- c. Relaxation of smooth muscle in the airways
- d. Relaxation of smooth muscle in the alveoli

4. The asthma educator is called to educate the parent of a six-year-old female who has asthma. She has a history of nasal congestion and sneezing in the early morning hours, which wakes her up and exacerbates her asthma during the daytime hours. Which of the following is the likely cause of her morning symptoms?

- a. Daytime allergies
- b. Dust mite exposure
- c. Inhaled irritants
- d. Upper respiratory infection

5. The Advair (fluticasone with salmeterol) Diskus is available in what dosages?

- a. 500/50, 250/50, 100/50
- b. 500/50, 110/75, 220/75
- c. 500/50, 250/50, 90/50
- d. 500/50, 200/50, 100/50

6. A 45-year-old male presents to the clinic for his six-month checkup. The patient complains of increasing nighttime symptoms, which occur up to four times per week. His daytime symptoms have also increased, with cough and shortness of breath occurring several times per week during waking hours. The patient currently uses levalbuterol two puffs q6h, and Advair 100/50 one puff twice a day (BID). Which of the following changes should be made to the patient's medication regimen?

- a. Increase the Advair dosage to 250/50 two puffs BID.
- b. Discontinue levalbuterol and substitute albuterol.
- c. Discontinue Advair and change to budesonide BID.
- d. Add cromolyn sodium two puffs daily.

7. When educating a patient on peak flow technique, the asthma educator asks the patient to demonstrate use of her peak flow meter. The patient takes a deep breath in, blows fast and hard into the peak flow meter, and records the value. Which of the following statements best describes this patient's peak flow meter technique?

- a. The patient demonstrates proper peak flow meter technique.
- b. The patient is exhaling too quickly into the peak flow meter.
- c. The patient needs to repeat the maneuver three times.
- d. The patient is blowing too forcefully into the peak flow meter.

8. A 37-year-old female presents to the clinic complaining that her albuterol inhaler is not relieving her asthma symptoms. She has a history of exercise-induced asthma and uses the inhaler 10 minutes prior to activity. She states that for the past few weeks, she is having shortness of breath during exercise despite using her inhaler. The clinician conducts a physical exam, and the findings are normal. What should the clinician do first?

- a. Add a low-dose inhaled corticosteroid to her medication regimen.
- b. Change her albuterol to cromolyn sodium.
- c. Ask her when she last refilled her inhaler.
- d. Instruct her to avoid sports for two weeks.

9. A seven-year-old female presents to the emergency department on a Monday morning with retractions, shortness of breath, and wheezing on inspiration and expiration. The patient's mother states that the patient began with a runny nose with clear mucus and persistent cough over the weekend. The mother states that the patient's breathing became progressively worse over the past few days. The patient has a pet cat who sleeps on her bed. She went on a field trip to the pumpkin farm three days prior where she went on a hayride and played in the leaves. The patient is also allergic to nuts. The patient is afebrile with diffuse wheezing in all lung fields. What is the likely cause of this patient's asthma episode?

- a. Cat dander exposure
- b. Outdoor allergen exposure
- c. Nut protein exposure
- d. Infectious disease exposure

10. Which of the following is a contraindication for the use of Xolair?

- a. History of tumors
- b. History of prior intubation
- c. History of refractory bronchospasm
- d. History of allergies

11. An asthma educator is called to educate an adult inpatient prior to discharge. The patient is eager to go home and is attempting to rush through the education session. What is the best way for the asthma educator to engage this patient in the asthma education session?

- a. Use a lecture-based approach to education.
- b. Use written handouts exclusively.
- c. Offer referral for a group session.
- d. Ask open-ended questions.

12. A three-year-old female presents to the clinic with coughing, retractions, and an SpO₂ of 88%. Diffuse wheezing is heard upon auscultation. The patient has a family history of asthma, but the patient has not had respiratory symptoms prior to this episode. The patient's symptoms began two days before and have become progressively worse. Which of the following is the most likely diagnosis for this patient?

- a. Asthma
- b. Reactive airway disease
- c. Viral upper respiratory infection
- d. Pneumonia

13. When asthma is severe and poorly controlled for long periods of time, what changes take place within the patient's respiratory system?

- a. Permanent airway remodeling
- b. Reversible inflammation
- c. Hypercapnia due to hyperventilation
- d. Cushing's disease due to corticosteroid use

14. Which of the following criteria is NOT used for the categorization of a patient's asthma?

- a. Impairment
- b. Risk
- c. Control
- d. Support

15. A 74-year-old male presents to the clinic for his routine six-month pulmonary function test. The patient was diagnosed with asthma in 1980 and takes inhaled corticosteroids daily. Today he is experiencing mild shortness of breath, which he attributes to working in his garden in the morning. The patient's respiratory rate is 22, and his breath sounds are clear to slightly diminished with a faint expiratory wheeze. What pattern should the clinician expect to see on this patient's flow volume loop?

- a. Normal lung function
- b. Reduced flows and normal volumes
- c. Reduced volumes and normal flows
- d. A restrictive pattern

16. A 16-year-old male presents to the clinic for his yearly checkup and asthma education session. The patient states that he was diagnosed with asthma six years ago. He states that his asthma episodes are always mild, requiring one dose of his short-acting bronchodilator. He plays sports regularly, with no impairment from his asthma. He states that his asthma is well controlled with one exacerbation per year or less. The patient takes Advair 150/50 twice daily and levalbuterol two puffs as needed. Which of the following actions should be taken at this time?

- a. Discontinue inhaled corticosteroids.
- b. Discontinue short-acting bronchodilators.
- c. Change Advair to daily dosing.
- d. Continue current medication regimen.

17. A 40-year-old male presents to the clinic for his first asthma education session. The patient states "I never have problems with my asthma. I had asthma in high school, but I outgrew it. I have an inhaler for emergencies, but I never use it. I get a chest cold once or twice a year, but that's all." Which of the following messages is most important to relay to this patient?

- a. It is very common to outgrow asthma.
- b. Despite good control, exacerbations can happen.
- c. Asthma can be life threatening.
- d. Daily medication is needed for asthma control.

18. All of the following are common signs and symptoms of asthma episodes EXCEPT:

- a. Cough and wheeze
- b. Throat clearing and orthopnea
- c. Dizziness and chest tightness
- d. Retractions and tracheal tugging

19. Which of the following statements is true regarding irritants and allergens?

- a. Allergens can also be irritants.
- b. Allergens can be avoided.
- c. Irritants do not cause allergy symptoms.
- d. Irritants are not natural substances.

20. Which of the following statements is true regarding asthma triggers?

- a. Leaf and wood smoke is harmful to all patients with asthma.
- b. Dust mites cause asthma symptoms in all asthma patients.
- c. Inhaled irritants cause shortness of breath in all asthma patients.
- d. Mold is harmful for some patients with asthma.

21. A seven-year-old male presents to the emergency room with an asthma exacerbation. The patient has a history of poorly controlled asthma with frequent and severe exacerbations. The patient is well known to the asthma educator because he has been admitted numerous times for his asthma. The patient's father is a smoker, and he smokes inside the home and car. The asthma educator is called to educate the patient's father on the dangers of smoking around a child with asthma. Which of the following choices is the MOST important action for the patient's father to take?

- a. The father must smoke outside until he is able to quit.
- b. The father must change his clothes after smoking.
- c. The father must not smoke in the car.
- d. The father must not smoke in the garage.

22. A 37-year-old male presents to the asthma educator's office. He states that his asthma has become worse since taking a promotion in the field of information technology. He states that his new cubicle is positioned by the printer and he has noticed an increase in symptoms since he moved his desk to the new location. He currently requires daily use of his rescue medication, despite using his inhaled corticosteroids as directed. He states that he loves his job and feels fulfilled in his new duties. He also states that he is afraid to approach his supervisor with his health problems because he does not want to lose his new job. What is the likely reason for his increased asthma symptoms?

- a. Dust from the printer paper
- b. Ozone from the printer
- c. Perfume from his office mates
- d. Stress from his new job

23. Which of the following statements is true regarding patients with asthma and allergies?

- a. Asthma is included under the Americans with Disabilities Act.
- b. Workplaces are not required to make concessions for patients with asthma.
- c. Students have no right to request asthma trigger avoidance measures in the classroom.
- d. Only food allergies are included under the Americans with Disabilities Act.

24. A 65-year-old male presents to the clinic complaining of increased severity and frequency of asthma symptoms. He states that he started a regimen of nonsteroidal anti-inflammatory drugs (NSAIDs) and cardioselective beta blockers due to an undisclosed heart condition four weeks ago. The patient has two cats and one dog in his home, and he is an avid gardener. He is also a swimmer and enjoys going to the senior center for a swim every morning. He says he has been a swimmer for all his life. He says that his increased asthma symptoms began about a month ago, and his short-acting bronchodilators aren't providing him with enough relief. What is the likely cause of his asthma symptoms?

- a. Beta blockers
- b. Cat and dog dander
- c. NSAIDs
- d. Exercise-induced asthma

25. The asthma educator is educating the family of a five-year-old female who has a history of asthma. The patient's bedroom is fully carpeted, with curtains on the windows and numerous stuffed animals on the bed. The patient was recently tested for allergies and was subsequently diagnosed with a dust mite allergy. She frequently wakes up with nasal allergy symptoms and mild asthma symptoms. Which of the following choices is the BEST action to take to mitigate dust mite exposure in the bedroom?

- a. Remove all stuffed animals from the bedroom.
- b. Replace carpeting with hardwood floors.
- c. Enclose the patient's mattress and pillows.
- d. Vacuum the patient's room twice weekly.

26. Which of the following statements is true regarding pet dander in the home?

- a. Pet dander can be restricted to one area in the home.
- b. Some pets are hypoallergenic and are safe for sensitive patients.
- c. Pet dander is an inhaled irritant.
- d. Pet saliva is a common allergen.

27. Which of the following choices is NOT an inhaled irritant?

- a. Scented candles
- b. Dust mites
- c. Bleach
- d. Essential oils

28. A 17-year-old female presents to the emergency department complaining of shortness of breath on exertion. She states that she recently joined the track team and is unable to keep up with her peers due to shortness of breath. She states that she starts coughing and wheezing partway through her running events and is unable to finish. The patient states that she uses her short-acting bronchodilator when the symptoms begin, and they subside within 10 minutes. The patient does not currently take any other medication. Which medication regimen change would be most helpful for this patient?

- a. Adding a low-dose inhaled corticosteroid
- b. Premedicating with a long-acting bronchodilator
- c. Premedicating with cromolyn sodium
- d. Adding a leukotriene modifier

29. A 16-year-old female presents to the clinic complaining of an asthma exacerbation. The patient's respiratory rate is 25 with accessory muscle use. Expiratory wheeze is heard upon auscultation. The patient has a barking cough and complains of throat irritation. The patient's voice is raspy, and she is having trouble speaking. The patient states that she has been using her rescue inhaler with no relief, and pharmacy records indicate that her inhaled corticosteroids have been refilled regularly. She states that she takes her inhalers exactly as directed. She is currently taking Fluticasone 110 mcg two puffs twice daily, albuterol two puffs twice daily, and montelukast 10 mg daily. A continuous nebulizer was administered with no change to the patient's condition. What should the asthma educator suggest at this time?

- a. Spirometry and visual inspection of the vocal cords
- b. Intubation and continuous nebulization
- c. Administration of racemic epinephrine
- d. Administration of saline nebulizer treatment

30. Which of the following statements is true regarding pregnancy and asthma?

- a. During pregnancy, a patient's asthma may become worse.
- b. During pregnancy, a patient may notice no change in asthma symptoms or severity.
- c. During pregnancy, a patient's asthma symptoms may improve.
- d. All of the above.

31. All of the following conditions are comorbidities for asthma EXCEPT:

- a. Allergic rhinitis
- b. Gastroesophageal reflux disease (GERD)
- c. Obstructive sleep apnea
- d. Vocal cord dysfunction

Answers and Explanations

- 1. A:** The three components of an asthma exacerbation are inflammation, bronchoconstriction, and mucus production.
- 2. C:** Although all the response choices are asthma triggers, leaf smoke and air fresheners are inhaled irritants. The other choices are allergens.
- 3. C:** Short-acting bronchodilators work on the smooth muscle lining of the airways by relaxing the muscles and opening the bronchioles.
- 4. B:** Early morning symptoms of nasal congestion, sneezing, and/or cough are often caused by exposure to dust mites in the pillow and/or bedding. Patients are exposed to these allergens throughout the night, causing early morning symptoms.
- 5. A:** The Advair Diskus comes in three dosages: 500/50, 250/50, and 100/50.
- 6. A:** The patient is currently taking the lowest possible Advair dosage. Increasing the dose to 250/50, which is the moderate dose, will likely improve his underlying inflammation and bronchoconstriction. Substituting albuterol for levalbuterol will make no difference because these medications are similar in composition. Changing from a combination inhaler such as Advair to a single corticosteroid inhaler such as budesonide will likely make the patient's symptoms worse. Finally, cromolyn sodium is not indicated in this vignette.
- 7. C:** When performing peak flows, the patient must take a maximum inhalation and blow hard and fast into the peak flow meter. Then the patient repeats the steps three times and records the best (highest) number of the three tries.
- 8. C:** This patient has a normal physical exam and is only having asthma symptoms during exercise. Because she states that her albuterol previously treated her exercise-induced asthma symptoms successfully, the clinician should first ask the patient when she last refilled her inhaler. Patients can shake an inhaler and assume that because they feel something moving inside, then it must be full. However, the propellant is the last to leave the inhaler, and there may be no medication inside at all.
- 9. B:** This patient is likely having an asthma episode secondary to outdoor allergen exposure. The patient is afebrile, with clear nasal mucus, which indicates that an infection is not likely. These symptoms may indicate an allergic exposure, but the source is likely not the patient's cat because these are new symptoms that just began after visiting the pumpkin farm. Playing in fallen leaves, going on hayrides, and other outdoor activities can cause allergic rhinitis and subsequent asthma exacerbation due to exposure to outdoor allergens such as mold.
- 10. A:** Xolair is approved for the treatment of severe allergic asthma in some patients who do not respond to traditional therapies. Patients with a history of tumors or cancer should not use this drug because it can cause malignant tumors in some populations.
- 11. D:** When conducting asthma education, a conversational approach is best. Asking open-ended questions and talking with a patient in a less formal manner can help to build a relationship with the patient and reveal clues as to the patient's overall health, asthma triggers, and asthma control. Although this patient is eager to go home, the educator should never just drop off handouts and leave. This is unacceptable because comprehensive asthma education is characterized by the exchange of information between the educator and the patient.

12. C: Although the patient has a family history of asthma, she does not have a history of asthma herself. In fact, this is the first episode of respiratory illness she has ever had. Although this may be the first in many asthmatic episodes, there is no pattern of symptoms to make that determination at this time. Reactive airway disease is also a cyclical respiratory disorder, which is similar to asthma. Often, patients with cyclical respiratory symptoms are diagnosed with reactive airway disease before age five, when an asthma diagnosis is commonly reached. Additionally, there are no chest films or other diagnostic test results to suggest a diagnosis of pneumonia.

13. A: Permanent airway remodeling is the result of chronic, poorly controlled asthma. These changes are irreversible and mimic chronic obstructive pulmonary disease (COPD).

14. D: A patient's asthma severity is categorized by measuring his or her impairment, risk, and level of control. Although support is a necessary component of successful asthma management, it is not one of the criteria used to measure severity.

15. B: The clinician should expect this patient to have a "scooped out" flow volume loop pattern with reduced flows and normal volumes. Patients with asthma often have air trapping due to a reduced ability to exhale completely during an exacerbation. This patient is currently experiencing asthma symptoms, so it is expected that his flow volume loop will look like an obstructive asthmatic pattern.

16. D: Although this patient's asthma is well controlled, it is likely well controlled due to his current medication regimen. Reducing Advair to once daily is not recommended because this medication has a 12-hour duration of efficacy. In addition, discontinuing short-acting bronchodilators is never recommended because this is the patient's rescue medication for emergencies.

17. B: Changes in environment, new allergies, and infections can all affect a patient's asthma. Although some patients have infrequent asthma exacerbations, it is important to reiterate that these patients must always be prepared for the possibility of an exacerbation. Patients do not outgrow asthma. Asthma changes over time, but the underlying disease process is always there.

18. C: All of the choices are common signs of an asthma episode except dizziness. Although some patients can become dizzy during hyperventilation or while experiencing dyspnea, dizziness is not a common asthma symptom.

19. B: Allergens can be avoided either by putting a barrier between you and the allergen or completely removing the allergen from your environment. Allergens are not irritants. Irritants are chemicals that cause airway inflammation and bronchoconstriction. Irritants can cause symptoms that are similar to those of an allergic reaction, such as nasal congestion, watery eyes, and runny nose. Irritants can also be natural substances such as leaf or wood smoke.

20. A: Triggers vary widely between patients with asthma. Some patients find that animal dander triggers their asthma, whereas other patients have furry pets with no change in their frequency or severity of symptoms. Dust mites are a common asthma symptom, but they do not affect all asthma patients. Inhaled irritants are another common asthma trigger, but they do not affect all patients with asthma. Option D is incorrect because mold is harmful for all patients with asthma, not some of them. Finally, option A is the correct answer because leaf and wood smoke are carcinogenic and harmful for ALL people, not just patients with asthma.

21. A: Although all of the choices are correct, the most important action to take is to smoke outside the home until he is able to quit. The patient's home should be free of asthma triggers, and secondhand smoke is a common asthma trigger. The patient spends most of his hours in the home,

especially at night when he is sleeping. Therefore, the interior of the home should be the first location where trigger control measures take place.

22. B: The likely cause of the patient's sudden increase in asthma symptoms is the ozone from the printer. Printers often emit ozone and other fumes, which can trigger asthma and cause exacerbations.

23. A: Asthma and allergies are protected under the Americans with Disabilities Act. Workplaces and schools must make reasonable accommodations for patients with asthma.

24. C: This patient has been a swimmer for his entire life, so exercise-induced asthma is not a likely cause of his asthma symptoms. In addition, there is no indication that the cats and dogs are new additions to his home, so they are not the likely cause of his symptoms. He states that the asthma symptoms became worse four weeks ago, which is when he began his new medication regimen. Although beta blockers are a common asthma trigger, cardioselective ones are not. Therefore, the likely cause of his asthma symptoms is the use of NSAIDs, which is a common asthma trigger.

25. C: Because this patient wakes up with allergy symptoms, she is likely breathing in dust mite droppings from inside her bedding and pillow. Enclosing the mattress and pillow with allergen encasements is an inexpensive and impactful way to combat dust mite exposure. Removing stuffed animals from a child's room is never recommended; these toys can be cleaned and/or rotated to allow the child to keep their comfort items while limiting dust mite exposure. Replacing carpeting with hardwood floors is a very expensive process and should not be a first-line defense for dust mite exposure. And finally, although vacuuming the patient's room will help with dust mite exposure, enclosing the patient's pillows is likely to have a more dramatic and impactful effect on the patient's asthma and allergy symptoms.

26. D: Pet saliva and dander are common allergens for patients who are sensitive to furry animals. Pet dander flakes off and becomes airborne, traveling through ductwork in homes and spreading throughout the building. Pet dander cannot be restricted to one area of the home. Hypoallergenic pets are considered to be lower allergy risk pets, but they still produce dander and saliva that can cause symptoms in sensitive patients. And finally, pet dander is an inhaled allergen, not an irritant.

27. B: Dust mites are allergens, not inhaled irritants. Any scented substance, natural or artificial, is an inhaled irritant. Bleach and other cleansers are very irritating to the airways and can cause severe asthma exacerbations.

28. C: The best choice out of the options given is to premedicate with cromolyn sodium. This is an alternative to the more common recommendation of premedicating with a short-acting bronchodilator, as stated in the stepwise approach to asthma management. Long-acting bronchodilators are maintenance medications and should never be used as a rescue inhaler for premedication prior to activity. Leukotriene modifiers are not helpful in this case because this patient has no known allergic history. In addition, adding a low-dose inhaled corticosteroid is not necessary if the patient is not having any symptoms outside of exercise and exertion.

29. A: This patient may have vocal cord dysfunction and should be assessed immediately. Vocal cord dysfunction mimics a refractory asthma exacerbation that is unresponsive to traditional therapy and features additional symptoms such as raspy voice and throat irritation. Option B is incorrect because this patient is not in acute or impending respiratory failure and, therefore, intubation is not necessary. Administering racemic epinephrine may be helpful if the patient was diagnosed with croup, but there is no mention of stridor in this patient's assessment. Finally,