

Chapter 01: The Anatomy and Physiology of the Respiratory System

1. Which of the following are primary components of the upper airway?
 - a. nose, oral cavity, pharynx
 - b. larynx, trachea, and bronchi
 - c. nose, oral cavity, larynx and trachea
 - d. nose, oral cavity, pharynx, larynx, and trachea

ANSWER: a

2. Which of the following is NOT a primary function of the nose?
 - a. humidify inspired gas
 - b. conduct gas and food to lower airway
 - c. filter the inspired gas
 - d. warm the inspired gas

ANSWER: b

3. Which of the following are functions of the upper airway?
 - I. Conduction of gas to lower airway
 - II. Prevent foreign materials from entering lower airway
 - III. Warm, filter, and humidify inspired gas
 - IV. Aid in speech and smell
 - a. I, II, III, and IV
 - b. I, III, and IV only
 - c. I, II, and III only
 - d. I, II, and IV only

ANSWER: a

4. Which structures form the upper third of the nose?
 - I. Nasal bones
 - II. Frontal process of maxilla
 - III. Lateral nasal cartilage
 - IV. Greater alar cartilage
 - a. Nasal bones
 - b. Frontal process of maxilla
 - c. Lateral nasal cartilage
 - d. Greater alar cartilage

ANSWER: b

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5. Which structure form the lower two-thirds of the nose?

- I. Lateral nasal cartilage
- II. Lesser and greater alar cartilages
- III. Septal cartilage
- IV. Fibrous fatty tissue

- a. Lateral nasal cartilage
- b. Lesser and greater alar cartilages
- c. Septal cartilage
- d. Fibrous fatty tissue

ANSWER: c

6. What is the term for widening of the nostrils that can occur during respiratory distress?

- a. grunting
- b. retractions
- c. alar collapse
- d. nasal flaring

ANSWER: d

7. Which of the following structures form the anterior nasal septum?

- I. Septal cartilage
- II. Vomer
- III. Perpendicular plate of ethmoid bone
- IV. Frontal process of maxilla

- a. Septal cartilage
- b. Vomer
- c. Perpendicular plate of ethmoid bone
- d. Frontal process of maxilla

ANSWER: a

8. The lymphatic channels are larger and more numerous in what location?

- a. upper lobes
- b. right lower lobe
- c. left lower lobe
- d. middle lobes

ANSWER: b

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9. What is the term for the openings created by the alae nasi and septal cartilage?
- a. nares
 - b. glottis
 - c. vestibule
 - d. choana

ANSWER: a

10. What type of epithelium lines the anterior third of the nasal cavity?
- a. cuboidal
 - b. pseudostratified ciliated columnar
 - c. stratified squamous
 - d. pseudostratified ciliated squamous

ANSWER: c

11. In which structure would vibrissae normally be found?
- a. oropharynx
 - b. laryngopharynx
 - c. nasal cavity
 - d. trachea

ANSWER: c

12. What is the submucosal layer of the tracheobronchial tree?
- a. lamina propria
 - b. cartilaginous layer
 - c. epithelial lining
 - d. mucous blanket

ANSWER: a

13. What is another term for conchae?
- a. alae
 - b. choana
 - c. vestibule
 - d. turbinates

ANSWER: d

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14. Where is the olfactory region located in the nasal cavity?

- a. choana
- b. vestibule
- c. superior and middle turbinates
- d. middle and inferior turbinates

ANSWER: c

15. Which of the following sinuses are considered to be paranasal sinuses?

- I. Maxillary
- II. Frontal
- III. Ethmoid
- IV. Sphenoid

- a. Maxillary
- b. Frontal
- c. Ethmoid
- d. Sphenoid

ANSWER: a

16. What effect, if any, would be expected from the topical application of phenylephrine on the nasal mucosa?

- a. vasoconstriction
- b. vasodilation
- c. no known effect
- d. bronchospasm

ANSWER: a

17. Among pediatric patients, in which age range is epistaxis most prevalent?

- a. 10-14 years
- b. 2-10 years
- c. 8-16 years
- d. newborn -2 years

ANSWER: b

18. Approximately what portion of the sense of taste is reliant upon the sense of smell?

- a. 60%
- b. 80%
- c. 40%
- d. 20%

ANSWER: b

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19. Which of the following can cause sinusitis?

- I. Upper respiratory infection
- II. Dental infection
- III. Air travel
- IV. Scuba diving

- a. Upper respiratory infection
- b. Dental infection
- c. Air travel
- d. Scuba diving

ANSWER: b

20. In the oral cavity, what is the term for the space between the teeth and lips?

- a. vibrissae
- b. ventricle
- c. vallecule
- d. vestibule

ANSWER: d

21. What is the name of the structure that secures the tongue to the floor of the mouth?

- a. uvula
- b. extrinsic lingual muscles
- c. intrinsic lingual muscles
- d. lingual frenulum

ANSWER: d

22. How many ribs are identified as true ribs, attached directly to the sternum?

- a. seven
- b. eight
- c. four
- d. six

ANSWER: a

23. To what structure is the uvula attached?

- a. hard palate
- b. palatopharyngeal arch
- c. palatoglossal arch
- d. soft palate

ANSWER: d

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24. What is another name for the palatine tonsils?

- a. adenoids
- b. faucial
- c. lingual
- d. pharyngeal

ANSWER: b

25. Which structure extends from the posterior nares to the superior portion of the soft palate?

- a. oropharynx
- b. palatine tonsils
- c. nasopharynx
- d. tongue

ANSWER: c

26. Which epithelium is present in the nasopharynx?

- a. pseudostratified squamous
- b. stratified squamous
- c. cuboidal
- d. pseudostratified ciliated columnar

ANSWER: d

27. What is another name for pharyngeal tonsils?

- a. palatine tonsils
- b. lingual tonsils
- c. faucial tonsils
- d. adenoids

ANSWER: d

28. What is another name for the pharyngotympanic tubes?

- a. adenoids
- b. conchae
- c. auditory
- d. faucial

ANSWER: c

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29. What is the most frequent cause of hearing loss in young children?

- a. tonsillitis
- b. pharyngitis
- c. sinusitis
- d. otitis media

ANSWER: d

30. Which structure extends from the soft palate to the base of the tongue?

- a. nasopharynx
- b. oropharynx
- c. uvula
- d. laryngopharynx

ANSWER: b

31. What type of epithelium is found in the oropharynx?

- a. stratified squamous
- b. pseudostratified squamous
- c. pseudostratified ciliated columnar
- d. cuboidal

ANSWER: a

32. What structure is located between the glossoepiglottic folds in the posterior oropharynx?

- a. vallecula epiglottica
- b. lingual tonsils
- c. rima glottidis
- d. palatine tonsils

ANSWER: a

33. What spoon-shaped fibrocartilaginous structure covers the opening of the larynx during swallowing?

- a. vocal folds
- b. base of the tongue
- c. vallecula
- d. epiglottis

ANSWER: d

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34. What is a common site for misplacement of endotracheal tubes during emergency intubation?
- a. stomach
 - b. left mainstem bronchus
 - c. esophagus
 - d. left upper lobar bronchus

ANSWER: c

35. Which structure extends from the base of the tongue to the upper end of the trachea?
- a. laryngopharynx
 - b. thyroid gland
 - c. larynx
 - d. rima glottidis

ANSWER: c

36. Which of the following are functions of the larynx?
- I. Passageway for gas
 - II. Protects against aspiration
 - III. Generation of sounds for speech
 - IV. Warming and filtration of inspired gas
- a. Passageway for gas
 - b. Protects against aspiration
 - c. Generation of sounds for speech
 - d. Warming and filtration of inspired gas

ANSWER: b

37. Which of the cartilages of the larynx are unpaired?
- a. thyroid, epiglottis, and arytenoid
 - b. arytenoid, cuneiform, and corniculate
 - c. thyroid, cricoid, and cuneiform
 - d. thyroid, epiglottis, and cricoid

ANSWER: d

38. To what structure does the upper portion of the thyroid cartilage attach by a membrane?
- a. mandible
 - b. hyoid bone
 - c. epiglottis
 - d. tongue

ANSWER: b

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39. Which laryngeal cartilage is primarily responsible for preventing food, liquids, and foreign bodies from entering the lower airways?
- a. cricoid
 - b. epiglottis
 - c. thyroid
 - d. corniculate

ANSWER: b

40. Which laryngeal cartilage is shaped like a signet ring and forms a large portion of the posterior laryngeal wall?
- a. epiglottis
 - b. cricoid
 - c. cuneiform
 - d. corniculate

ANSWER: b

41. Which of the laryngeal cartilages are single?
- I. Cuneiform
 - II. Thyroid
 - III. Epiglottis
 - IV. Cricoid

- a. Cuneiform
- b. Thyroid
- c. Epiglottis
- d. Cricoid

ANSWER: b

42. What is the space between the true vocal cords called?
- a. vallecule
 - b. vestibule
 - c. rima glottidis
 - d. choana

ANSWER: c

43. What is **not** a common cause of posterior nosebleeds?
- a. nasal tumors
 - b. serious nose trauma
 - c. high altitude
 - d. drug abuse

ANSWER: c

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44. Which of the following is a subglottic airway obstruction usually caused by the parainfluenza virus?
- a. pharyngitis
 - b. laryngotracheobronchitis (LTB)
 - c. epiglottitis
 - d. tonsillitis

ANSWER: b

45. What is causative agent in the majority of cases of acute epiglottitis?
- a. Streptococcus
 - b. MRSA
 - c. Parainfluenza virus
 - d. Haemophilus influenzae type B

ANSWER: d

46. Which type of epithelium is present in the larynx above the vocal cords?
- a. pseudostratified squamous
 - b. stratified squamous
 - c. cuboidal
 - d. pseudostratified ciliated columnar

ANSWER: b

47. Which laryngeal muscles are primarily responsible for adduction of the vocal cords?
- a. transverse arytenoid
 - b. lateral cricoarytenoid
 - c. posterior cricoarytenoid
 - d. thyroarytenoid

ANSWER: b

48. Which of the following muscles pull the larynx and hyoid downward?
- a. suprahyoid group
 - b. cricothyroid muscles
 - c. posterior cricoarytenoid muscles
 - d. infrahyoid group

ANSWER: d

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49. What is the secondary vital function of the larynx?

- a. Gag reflex
- b. Babinski reflex
- c. Valsalva's maneuver
- d. Moro maneuver

ANSWER: c

50. What type of epithelium extends from the trachea to the respiratory bronchioles?

- a. stratified squamous
- b. pseudostratified squamous
- c. cuboidal
- d. pseudostratified ciliated columnar

ANSWER: d

51. What is the primary component of the mucous blanket in the tracheobronchial tree?

- a. glycoproteins
- b. water
- c. lipids
- d. DNA

ANSWER: b

52. At what level in the tracheobronchial tree are cilia completely absent?

- a. respiratory bronchioles
- b. bronchioles
- c. lobar bronchi
- d. mainstem bronchi

ANSWER: a

53. Which cranial nerve innervates the submucosal glands?

- a. tenth
- b. ninth
- c. seventh
- d. eighth

ANSWER: a

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54. What is the term for the viscous layer of the mucous blanket?

- a. gel
- b. epoxic
- c. basal
- d. sol

ANSWER: a

55. How many times per minute do the cilia in the tracheobronchial tree move?

- a. 1500 times
- b. 2500 times
- c. 500 times
- d. 50 times

ANSWER: a

56. When excessive secretions are present in the lungs, what term describes the sound heard by auscultation over large airways during exhalation?

- a. crackles
- b. stridor
- c. rhonchi
- d. wheeze

ANSWER: c

57. Which of the following factors can alter the mucociliary transport mechanism?

- I. Excessive bronchial secretions
- II. Tobacco smoke
- III. Hypoxia
- IV. Air pollution

- a. Excessive bronchial secretions
- b. Tobacco smoke
- c. Hypoxia
- d. Air pollution

ANSWER: b

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58. Where are mast cells located in the tracheobronchial tree?

- I. Lamina propria
- II. Intra-alveolar septa
- III. Sub-mucosal glands

- a. Lamina propria
- b. Intra-alveolar septa
- c. Sub-mucosal glands
- d.

ANSWER: a

59. Approximately how many IgE receptor sites are present on a single mast cell?

- a. 1,000 - 5,000
- b. 1,000,000 - 5,000,000
- c. 100 - 500
- d. 100,000 - 500,000

ANSWER: d

60. When degranulation of mast cells occurs and chemical mediators are released, which of the following would occur in the lungs?

- I. Increased vascular permeability
- II. Increased mucus production
- III. Smooth muscle relaxation
- IV. Vasodilation with edema

- a. Increased vascular permeability
- b. Increased mucus production
- c. Smooth muscle relaxation
- d. Vasodilation with edema

ANSWER: a

61. What is the term for the cartilaginous airways?

- a. respiratory unit
- b. acinus
- c. conducting zone
- d. tracheobronchial tree

ANSWER: c

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62. In cm, what is the average diameter of the adult trachea?

- a. 0.5 - 1.5 cm
- b. 2.0-3.5 cm
- c. 0.75 - 1.0 cm
- d. 1.5 - 2.5 cm

ANSWER: d

63. What is the term for the bifurcation of the trachea?

- a. hilum
- b. carina
- c. concha
- d. choana

ANSWER: b

64. In an adult, at what angle does the left mainstem bronchus branch from the trachea?

- a. 40-60 degrees
- b. 10-15 degrees
- c. 60-75 degrees
- d. 25-40 degrees

ANSWER: a

65. What is the recommended “safe range” for endotracheal tube cuff pressures?

- a. 30-35 mm Hg
- b. 45-50 mm Hg
- c. 20-25 mm Hg
- d. 35-40 mm Hg

ANSWER: c

66. Which vessel is the most commonly associated with massive hemorrhage following a tracheostomy?

- a. pulmonary artery
- b. subclavian artery
- c. carotid artery
- d. innominate artery

ANSWER: d

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67. In the newborn, at what angles do the right and left mainstem bronchi form with the trachea?

- a. both form a 55 degree angle
- b. right forms a 60 degree angle, left forms a 25 degree angle
- c. right forms a 25 degree angle, left forms a 60 degree angle
- d. both form a 40 degree angle

ANSWER: a

68. In an adult, into which structure would an endotracheal tube likely enter if the tube is inadvertently advanced too far?

- a. left lower lobar bronchus
- b. left mainstem bronchus
- c. right mainstem bronchus
- d. right middle lobar bronchus

ANSWER: c

69. How many second generation bronchi would you find in a healthy adult tracheobronchial tree?

- a. 3
- b. 2
- c. 6
- d. 5

ANSWER: d

70. How many segmental bronchi are found in each of the lungs?

- a. each lung has 8
- b. 8 in right lung, 10 in left lung
- c. 10 in right lung, 8 in left lung
- d. each lung has 10

ANSWER: c

71. What is another term for *primary lobule*?

- I. Acinus
- II. Functional units
- III. Terminal respiratory unit
- IV. Lung parenchyma

- a. Acinus
- b. Functional units
- c. Terminal respiratory unit
- d. Lung parenchyma

ANSWER: b

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72. At which airway generation do Canals of Lambert appear?

- a. 12-15
- b. 16 - 19
- c. 6-9
- d. 20-26

ANSWER: b

73. At what point in the tracheobronchial tree are Clara cells present?

- a. bronchioles
- b. respiratory bronchioles
- c. subsegmental bronchi
- d. terminal bronchioles

ANSWER: d

74. How does the total cross-sectional area of the tracheobronchial tree change from the trachea to the respiratory zone?

- a. It increases steadily to the terminal bronchioles then increases significantly in the respiratory zone
- b. It decreases slightly to the terminal bronchioles then decreases significantly
- c. It remains steady throughout the tracheobronchial tree
- d. It increases steadily through the lobar bronchi then increases significantly through the remaining airway generations

ANSWER: a

75. Which structures are nourished by the bronchial arteries?

- a. trache through the terminal bronchioles
- b. respiratory zone
- c. noncartilaginous airways only
- d. trachea and mainstem bronchi only

ANSWER: a

76. In the adult male, approximately how many alveoli are present in the lungs?

- a. 180 million b. 300 million
- c. 600 million d. 130 million

ANSWER: b

77. What type of epithelium composes 95% of the alveolar surface?

- a. Type IV (pseudostratified squamous) b. Type I (squamous pneumocyte)
- c. Type II (cuboidal) d. Type III (macrophages)

ANSWER: b

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78. In the lungs of a healthy young adult male, what is the average surface area available for gas exchange?
- a. 50 square meters b. 100 square meters
 - c. 300 square meters d. 70 square meters

ANSWER: d

79. Which alveolar cells are considered to be the source of pulmonary surfactant?
- a. Type I b. Type II
 - c. Type III d. Type IV

ANSWER: b

80. What is the term for the openings in the walls of interalveolar septa?
- a. Loose space b. Clara cells
 - c. Canals of Lambert d. Pores of Kohn

ANSWER: d

81. What is the average thickness of the Type I alveolar cell?
- a. 1-5 mm b. 0.1-0.5 mm
 - c. 1-5 microns d. 0.1-0.5 microns

ANSWER: d

82. Which alveolar cells are macrophages?
- a. Type IV b. Type III
 - c. Type I d. Type II

ANSWER: b

83. In which portion of the primary lobule does the majority of gas exchange occur?
- a. Type II pneumocyte b. loose space of interstitium
 - c. Pores of Kohn d. tight space of interstitium

ANSWER: d

84. Which is **not** a wall layer for pulmonary arteries?
- a. tunica intima b. tunica externicus
 - c. tunica adventitia d. tunica media

ANSWER: b

85. What type of epithelium is present in the pulmonary capillaries?
- a. cuboidal b. pseudostratified columnar
 - c. squamous d. pseudostratified squamous

ANSWER: c

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86. How many pulmonary veins empty into the left atrium?

- a. 8 b. 4
- c. 2 d. 0

ANSWER: b

87. From what area deep in the lungs do lymphatic vessels arise?

- a. Type II alveolar cells b. tight space of interstitium
- c. Type III alveolar cells d. loose space of interstitium

ANSWER: d

88. On which portion(s) of the right lung surfaces would the majority of lymphatic vessels be located?

- a. upper lobes b. Lymphatic vessels are distributed equally on all lobes
- c. middle lobe d. lower lobes

ANSWER: d

89. What is the term for the vessels adjacent to peribronchovascular lymphatic vessels?

- a. tertiary lymphatics b. cardinal lymphatics
- c. Type IV lymphatics d. juxta-alveolar lymphatics

ANSWER: d

90. What effect does stimulation of the beta 2 receptors have on the pulmonary system?

- a. bronchodilation b. vasoconstriction
- c. vasodilation d. bronchoconstriction

ANSWER: a

91. Which neurotransmitter is released when the parasympathetic system is activated?

- a. prostaglandin b. epinephrine
- c. norepinephrine d. norepinephrine

ANSWER: d

92. What is the general term for drugs that block the effects of the parasympathetic nervous system on the bronchial smooth muscle?

- a. anticholinergic b. parasympathomimetic
- c. sympathomimetic d. beta adrenergic

ANSWER: a

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93. What effect does stimulation of the sympathetic nervous system have on the body?

- I. Dilates the pupils
 - II. Causes bronchodilation
 - III. Increases rate and force of cardiac contractions
-
- a. Dilates the pupils
 - b. Causes bronchodilation
 - c. Increases rate and force of cardiac contractions
 - d.

ANSWER: a

94. When an acute asthma episode occurs, which quick relief agent is most commonly administered?

- a. formoterol
- b. arformoterol
- c. albuterol
- d. salmeterol

ANSWER: c

95. In the healthy adult, what are the normal anterior boundaries of the lungs?

- a. Between first and eighth ribs
- b. Between the second and eleventh ribs
- c. Between first and sixth ribs
- d. Between the second and ninth ribs

ANSWER: c

96. What is the term for the uppermost portion of the upright lung?

- a. hilum
- b. lingula
- c. apex
- d. base

ANSWER: c

97. How many bronchopulmonary segments are located in the lower lobe of the right lung?

- a. 4
- b. 5
- c. 2
- d. 3

ANSWER: c

98. What is the term for the therapeutic positional measures which utilize gravity to assist in secretion removal from the lungs?

- a. chest wall oscillation
- b. percussion
- c. postural drainage
- d. vibration

ANSWER: c

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99. Which structures are contained in the mediastinum?

- I. Trachea
- II. Great vessels
- III. Portions of the esophagus
- IV. Pituitary gland

- a. Trachea
- b. Great vessels
- c. Portions of the esophagus
- d. Pituitary gland

ANSWER: d

100. What is the term for the potential space between the visceral and parietal pleura?

- a. pericardial cavity
- b. thoracic cavity
- c. pleural cavity
- d. mediastinum

ANSWER: c

101. What is the superior portion of the sternum called?

- a. manubrium sterni
- b. body
- c. maxilla sterni
- d. xiphoid process

ANSWER: a

102. What is the term for inflammation of the pleural membranes?

- a. pleurisy
- b. empyema
- c. pneumothorax
- d. pleural effusion

ANSWER: a

103. What is the term for the abnormal collection of fluid in the pleural cavity?

- a. empyema
- b. hemothorax
- c. pneumothorax
- d. pleural effusion

ANSWER: d

104. In a pneumothorax, where does the abnormal collection of air accumulate?

- a. pleural cavity
- b. mediastinum
- c. thoracic cavity
- d. pericardium

ANSWER: a

105. What is one of the most common iatrogenic complications from a thoracentesis?

- a. pleural effusion
- b. empyema
- c. pneumothorax
- d. hemorrhage

ANSWER: c

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106. Which two muscles come together at the central tendon?

- a. sternum b. trapezius
- c. external intercostals d. hemidiaphragm

ANSWER: d

107. Which nerves supply the primary motor innervation to the right and left hemidiaphragms?

- a. vagus b. phrenic
- c. Thoracic nerves 1-3 d. IX cranial

ANSWER: b

108. Which structure moves in a “pump handle-like motion” during inspiration?

- a. diaphragm b. sternum
- c. external intercostals d. internal intercostals

ANSWER: b

109. Which of the following are scalene muscles?

- I. Anterior
- II. Exterior
- III. Medial
- IV. Posterior

- a. Anterior b. Exterior
- c. Medial d. Posterior

ANSWER: d

110. Which of the following are accessory muscles of expiration?

- I. Rectus abdominis
- II. Transverse abdominis
- III. Internal intercostals
- IV. Pectoralis major

- a. Rectus abdominis b. Transverse abdominis
- c. Internal intercostals d. Pectoralis major

ANSWER: d