EFFECTS OF TOBACCO ON THE RESPIRATORY SYSTEM

Funding for Quit Tobacco International is provided by the U.S. National Institutes of Health, Fogarty International Centre (R01 TW05969-01, RO1TW007944-01).

Quit Tobacco International, including development of the curriculum, is a team effort, in which individuals have different responsibilities as described below:

Lead institution(s) involved in module development

Gadjah Mada University, Indonesia
Dr. Nawi Ng, MD, MPH, PhD
Dr. Arika Dewi, MD, MPH
Dr. Wika Hartanti, MD

Sree Chitra Tirunal Institute for Medical Sciences and Technology, India
Dr K R Thankappan, MD
Dr Meena Daivadanam, MBBS, MPH
Dr Thankachy Ramachandran Yamini, MBBS, MPH

University of Arizona, USA
Dr. Mimi Nichter, PhD
Dr. Mark Nichter PhD, MPH
Dr. Myra Muramoto, MD, MPH
Charla Dain, MM

Partner institutions participating in pilot testing

India:
Academy of Medical Sciences, Pariyaram, Kerala
Amrita School of Medicine, Kochi, Kerala
Bangalore Medical College, Bangalore, Karnataka
Kasturba Medical College, Mangalore, Karnataka
TD Government Medical College, Alappuzha, Kerala

Indonesia:
Gadjah Mada University, Yogyakarta
Hasanuddin University, Makasar, South Sulawesi
Muhammadiyah University of Yogyakarta
Islamic University of Indonesia, Yogyakarta

EFFECTS OF TOBACCO ON THE RESPIRATORY SYSTEM

I. GOAL OF MODULE: Provide students with knowledge and skills on tobacco issues related to the respiratory system

II. TARGET AUDIENCE

a. Level of Student/Learner: 6th Semester
b. Suggested Course or Subject: *Dept. of General / Respiratory Medicine*

- Describe the burden of smoking among asthma patients.

III. LEARNING OBJECTIVES

1. To understand the burden of smoking among TB patients.
2. To understand the association between smoking and TB, and the impact of smoking on TB.
3. To conduct counseling to encourage TB patients to quit smoking.
4. To describe the burden of smoking among COPD patients.
5. To describe the association between smoking and COPD and the impact of smoking on COPD.
6. To understand the importance of cessation counseling for COPD patients.
7. To describe the burden of smoking among asthma patients.
8. To describe the association between smoking and asthma, and the impact of smoking on asthma management and control.
9. To understand the importance of counseling asthma patients or their parents to quit smoking.

IV. CURRICULUM STANDARDS ADDRESSED:

The General Medicine department has the broad goal of teaching undergraduate medical students the knowedge, skills and behavioural attributes to function effectively as the first contact physician. It has a total of 180 hours of which 10 hours are for Tuberculosis and respiratory diseases. Time from this slot can be used for this module.

- Students will be able to diagnose common clinical disorders, outline various modes of management, propose and interpret diagnostic and investigative procedures, and provide first level management of acute emergencies.

Skills:

- Students will develop clinical skills to assess various common medical disorders and emergencies, perform simple routine investigations, assist in common bed-side investigative procedures, and be able to refer a patient to secondary or tertiary level health care.

V. MINI-LECTURES

MINI LECTURE 1: TOBACCO AND TUBERCULOSIS

CORE SLIDES

1. Global Burden of TB
2. TB in India
3. Smoking: A Risk Factor for TB
4. Smoking Interferes with TB Treatment and Places Household Members at Risk
5. Secondhand Smoking and TB
6. Smoking and Respiratory Infections: Mechanisms
7. Smoking Cessation: TB Patients
8. DOTS Providers and Smoking Cessation

OPTIONAL SLIDES

1. Burden of TB in Five Countries
2. Smoking, TB Clinical Manifestation, Conversion, and Relapse
3. Smoking and TB: Immunopathogenesis
4. Iron, Smoking, and TB
5. Cessation Messages: TB Patients
6. WHO, TB, and Tobacco: Key Messages

MINI LECTURE 2: TOBACCO AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

CORE SLIDES

1. Global Burden of COPD
2. Smoking: A Risk Factor for COPD
3. Smoking and Respiratory Infection: Mechanisms
4. Secondhand Smoke and COPD
5. Indoor Air Pollution and COPD
6. Smoking Cessation: COPD Patients
7. Cessation Messages: COPD Patients

OPTIONAL SLIDES

1. COPD Prevalence in India
2. Pathophysiology of COPD
3. Immunological Aspect of COPD
4. Smoking, Chronic Bronchitis, and COPD Mortality

MINI LECTURE 3: TOBACCO AND ASTHMA

CORE SLIDES

1. Global Burden of Adult Asthma

2. Active Smoking and Asthma
3. Secondhand Smoke and Asthma
4. Smoking and Children with Asthma
5. Smoking, Cessation, and Asthma Treatment
6. Cessation Messages: Asthma Patients
7. Clinical Approach: Smoker Asthma Patient

OPTIONAL SLIDES

1. Global Burden: Childhood Asthma
2. Burden of Asthma in India
3. Smoking and Steroid Resistance
4. Smoking and Health Care Utilization

VI. CASE DISCUSSION / CLINICAL SCENARIO AND SKILLS CHECKLIST

Overview

In this module, students are asked to practice integrated communication with simulated patients under supervision of instructors in order to develop their smoking cessation skills. Students will be trained to routinely ask about patients' smoking status in every anamneses. After obtaining pasients' current smoking status, students will then practice how to assess patients' readiness to quit, advise and assist patients to quit smoking, and also arrange follow ups to monitor patients' smoking cessation progress. Therefore, students will also learn how to deliver efficient encouragement and provide proper explanation about the harm of tobacco on health, particularly respiratory systems, and to help patients on their smoking cessation attempts.

Introduction

To control the tobacco epidemic, all parties should work together in a strategic and sustainable way, including health professionals. Simple advice from a physician has been shown to increase abstinence rates significantly (by 30%) compared to no advice. Likewise, nursing-led interventions for smoking cessation increase by 50% the chances of successfully quitting. To be able to give advice,doctors must ask the patients about tobacco use. This should be integrated in assessments of every patient.

Learning Objective

Upon the completion of this skills laboratory practice, students are expected to be able to:

- Routinely ask all the patients about their smoking status
- Assess patients' readiness to quit
- Advise patients with respiratory problems to quit smoking
- Assist the patients to quit
- Arrange follow ups on patients' smoking cessation progress
- Explain the harm of tobacco on respiratory system

Asking the patients' smoking history

Doctors need patients' information to determine diagnosis and decide treatment, and the patient is obligated to give the information to their doctor. Although a major risk factor for many acute and chronic diseases, smoking status is rarely asked by doctor of their patients.

In a survey done by QTI, 77% of Indonesian doctors did not routinely ask patients about smoking. This situation has made doctors lose the opportunity to advise patients to quit and for patients to receive help from doctor to quit. Research studies show that if doctors have a reminder to ask about smoking, e.g., smoking status is part of the vital signs, doctors are three times more likely to advise patients to quit. (Fiore, et al. 2000)

There are several important factors that should be considered when we are asking the patients'smoking history, i.e. 1) asking the smoking status of all patients (including women and teenagers); 2) if a patient does not smoke, they should be asked if they have ever smoked (because even after quitting, a smoker can start again); 3) questions should be delivered in non-critical manner; 4) evaluate the patients' smoking history (how many cigarettes they smoke daily, do they use any other forms of tobacco); and 5) make a note on the patients' smoking status in the medical record (maybe you can place patients' smoking status in your patient's card).

Case Scenario:

A fifty-six year-old man presented with severe coughing and shortness of breath. He has been having history of recurrent dyspnea for three years that has become worse in the past three months. His respiratory rate was 34/minute. Wheezing was found on chest examination. Spirometry test showed a peak expiratory flow (PEF) of 50% predictive value and the oximetry test was 84%. He is a heavy smoker who started smoking at 15 years of age. He usually smokes 2 packs of cigarettes per day.

Vital Signs
Blood Pressure: 130/90
Pulse: 104/min
Body Weight: 74 kgs
Temperature: 97 F
Smoking Status: Smoker Ex-Smokers Never Smoke (Circle one)
Smoking Status of Spouse: Smoker Ex-Smokers Never Smoke (Circle one)

Checklist for Case Scenario

S.No.	Aspects	Please tick if student has covered this aspect

	Ask	
1.	• Ask patient whether he/she smokes or not	
2.	• If the patient doesn't smoke, ask whether he/she ever smoked before	
3.	• If the patient smokes, ask how many cigarettes he/she takes per day	
	Assess	
4.	• Assess patient's readiness to quit.	
	Advise	
5.	• Advise patient to quit smoking	
6.	• Personalize advice by using the tobacco user's health status/disease	
	Assist	
7.	• Assist the patients to quit by giving him/her pamphlets, brochures	
	Arrange for Follow-up	
8.	• Arrange to follow up on tobacco use	

Points for Discussion:

- Tobacco use is one of the most powerful risk factors for COPD. However, the patient should be made to understand that it is not too late to stop smoking.
- Those with mild disease can slow the progression of the disease by smoking cessation.
- The patient should be made aware of the carbon monoxide inhaled with smoking. Since they are already oxygen deficient, the carbon monoxide makes this worse. The doctor should explain that carbon monoxide interferes with oxygen transport.

MODULE: EFFECTS OF TOBACCO ON THE RESPIRATORY SYSTEM

FACT SHEET

The fact sheets are to be used by the tutor to supplement the discussion about the scenario. This fact sheet will address background information on tobacco that could be relevant to the scenario.

Tobacco and Tuberculosis

1. TB and Tobacco are two massive related health problems in Indonesia.
2. Indonesia is a country with the third largest TB burden in the world after India and China.
3. TB is number one killer among infectious diseases and number three on the list of 10 leading killer diseases in Indonesia (after cardiovascular and acute respiratory disease).
4. In Indonesia, nearly 300 people die of TB every day, and more than 100,000 people die per year.
5. Most TB patients are still in the productive ages (15-55 years).
6. The risk of getting TB is 1.8 times higher for light smokers compared to non-smokers, and 3.7 times higher for heavy smokers compared to non-smokers.
7. The risk of dying from TB is 4.5 times higher for smokers compared to non-smokers.
8. The risk of TB relapse is 3 times higher for those who smoked following short course of TB treatment

Tobacco and Chronic Obstructive Pulmonary Disease (COPD)

1. An estimated 210 million people have COPD worldwide.[1]
2. The primary cause of COPD is tobacco smoke (through tobacco use or second-hand smoke).[1]
3. Chronic obstructive pulmonary disease (COPD) was diagnosed in the case of 46.4% of active smokers and 28.0% of passive smokers.[2]
4. More than 3 million people died of COPD in 2005, which is equal to 5% of all deaths globally that year.[1]
5. Almost 90% of COPD deaths occur in low- and middle-income countries.[1]
6. According to the World Health Organization (WHO), 75% of deaths from COPD that occur in developed countries are directly related to smoking tobacco.
7. Total deaths from COPD are projected to increase by more than 30% in the next 10 years unless urgent action is taken to reduce underlying risk factors, especially tobacco use.[1]
8. Higher cumulative lifetime home and work exposure were associated with a greater risk of COPD.[3]
9. Members of families in which there is more than one active smoker more often suffer from COPD, smoke ten cigarettes per 24 hours more, and smoke ten years longer than members of families in which there is only one active smoker.[2]
10. The overall prognosis for a patient with COPD depends on the severity of lung disease and whether the patient continues to smoke.[4]
11. The earlier the quitting, the better the improvement of FEV1.[5]

REFERENCES:

1. World Health Organization. Global surveillance, prevention and control of chronic respiratory diseases. Geneva: World Health Organization; 2007.
2. Kałucka S. The occurrence of chronic obstructive pulmonary disease (COPD) in cigarette smoking families. Przegl Lek. 2006; 63(10):848–57.
3. Eisner MD, Balmes J, Katz PP, Trupin L, Yelin EH, Blanc PD. Lifetime environmental tobacco smoke exposure and the risk of chronic obstructive pulmonary disease. Environ Health. 2005 May 12; 4(1):7.
4. Chronic Obstructive Pulmonary Disease (COPD). Reviewed by: Swierzewski SJ III. Original Date of Publication: 01 Jun 2000. http://www.pulmonologychannel.com/copd/causes.shtml
5. Bartal M. COPD and tobacco smoke. Monaldi Arch Chest Dis. 2005; 63(4):213–25.

1. REFERENCE LIST FOR MODULE

MINI LECTURE 1: Tobacco and Tuberculosis

1. Arcavi L, Benowitz NL. Cigarette smoking and infection. Arch Intern Med. 2004; 164(20):2206–16.
2. Pradeepkumar AS, Thankappan KR, Nichter M: Smoking among tuberculosis patients in Kerala, India: proactive cessation efforts are urgently needed. Int J Tuberc Lung Dis. 2008; 12:1139–45.
3. Gajalakshmi V, Peto R, Kanaka TS, Jha P. Smoking and mortality from tuberculosis and other diseases in India: retrospective study of 43 000 adult male deaths and 35000 controls. Lancet. 2003; 362: 507–15.
4. Bates MN, Khalakdina A, Pai M, Chang L, Lessa F, Smith KR. Risk of tuberculosis from exposure to tobacco smoke: a systematic review and meta-analysis. Arch Intern Med. 2007; 167(4):335–42.
5. Boelaert JR, Vandecasteele SJ, Appelberg R, Gordeuk VR. The effect of the host's iron status on tuberculosis. J Infect Dis. 2007; 195(12):1745–53.
6. Chiang CY, Slama K, Enarson DA. Associations between tobacco and tuberculosis. Int J Tuberc Lung Dis. 2007; 11(3):258–62.
7. Davies PD, Yew WW, Ganguly D, Davidow AL, Reichman LB, Dheda K, et al. Smoking and tuberculosis: the epidemiological association and immunopathogenesis. Trans R Soc Trop Med Hyg. 2006; 100(4):291–8.
8. Lin HH, Ezzati M, Murray M. Tobacco smoke, indoor air pollution and tuberculosis: a systematic review and meta-analysis. PLoS Med. 2007; 4(1):e20.
9. McBride CM, Emmons KM, Lipkus IM. Understanding the potential of teachable moments: the case of smoking cessation. Health Educ Res. 2003; 18(2):156–70.
10. Ministry of Health Indonesia. Indonesia Health Profile 2001. Jakarta: Ministry of Health, Indonesia 2002.
11. Ng N, Padmawati RS, Prabandari YS, Nichter M. Smoking behavior among former tuberculosis patients in Indonesia: intervention is needed. Int J Tuberc Lung Dis. 2008; 12(5):567–72.
12. Siddiqi K, Lee AC. An integrated approach to treat tobacco addiction in countries with high tuberculosis incidence. Trop Med Int Health. 2009; 14(4):420–8.
13. Slama K, Chiang CY, Enarson DA. Tobacco cessation and brief advice. Int J Tuberc Lung Dis. 2007; 11(6):612–6.
14. Soemantri S, Senewe FP, Tjandrarini DH, Day R, Basri C, Manissero D, et al. Three-fold reduction in the prevalence of tuberculosis over 25 years in Indonesia. Int J Tuberc Lung Dis. 2007; 11(4):398–404.
15. World Health Organization. Global tuberculosis control: surveillance, planning, financing. Geneva: World Health Organization 2007. Report No.: WHO/HTM/TB/2007.376.
16. World Health Organization, International Union against Tuberculosis and Lung Disease. A WHO/The Union monograph on TB and tobacco control: joining efforts to control two related global epidemics. WHO/HTM/TB/2007.390. Geneva, World Health Organization, 2007.
17. Leung CC, Lam TH, Ho KS, Yew WW, Tam CM, Chan WM. Passive smoking and tuberculosis. Arch Intern Med. 2010; 170(3):287–92.

18. Agarwal SP, Vijay S, Kumar P, Chauhan LS. The history of tuberculosis control in India: glimpses through decades. In Agarwal SP, Chauhan LS (eds.), Tuberculosis control in India. New Delhi: Directorate General of Health Services, Ministry of Health and Family Welfare: Elsevier; 2005. Pp. 15–22.
19. Shang S, Ordway D, Henao-Tamayo M, Bai X, Oberley-Deegan R, Shanley C. Cigarette smoke increases susceptibility to tuberculosis--evidence from in vivo and in vitro models. J Infect Dis. 2011; 203(9):1240–8. Epub 2011 Feb 28.
20. van ZylSmit RN, Pai M, Yew WW, Leung CC, Zumla A, Bateman ED, et al. Global lung health: the colliding epidemics of tuberculosis, tobacco smoking, HIV, and COPD. Eur Respir J. 2010; 35:27–33.
21. Slama K, Chiang C Y, Enarson D A, Hassmiller K, Fanning A, Gupta P, et al. Tobacco and tuberculosis: a qualitative systematic review and meta-analysis. Int J Tuberc Lung Dis. 2007; 11(10):1049–61.
22. Guler M, Unsal E, Dursun B, Aydln O, Capan N. Factors influencing sputum smear and culture conversion time among patients with new case pulmonary tuberculosis. Int J Clin Pract. 2007; 61(2):231–5.
23. Ruddy M, Balabanova Y, Graham C, Fedorin I, Malomanova N, Elisarova E, et al. Rates of drug resistance and risk factor analysis in civilian and prison patients with tuberculosis in Samara Region, Russia. Thorax. 2005; 60:130–135. doi: 10.1136/thx.2004.026922
24. Batista JAL, Militão de Albuquerque MFP, de Alencar Ximenes RA, Rodrigues LC. Smoking increases the risk of relapse after successful tuberculosis treatment. Int J Epidemiol. 2008; 37(4):841–51.

MINI LECTURE 2: Tobacco and Chronic Obstructive Pulmonary Disease (COPD)

1. Arcavi L, Benowitz NL. Cigarette smoking and infection. Arch Intern Med. 2004; 164(20):2206–16.
2. Calverley PM, Walker P. Chronic obstructive pulmonary disease. Lancet. 2003; 362(9389):1053–61.
3. Cosio MG, Saetta M, Agusti A. Immunologic aspects of chronic obstructive pulmonary disease. N Engl J Med. 2009; 360(23):2445–54.
4. Godtfredsen NS, Lam TH, Hansel TT, Leon ME, Gray N, Dresler C, et al. COPD-related morbidity and mortality after smoking cessation: status of the evidence. Eur Respir J. 2008; 32(4):844–53.
5. Halbert RJ, Natoli JL, Gano A, Badamgarav E, Buist AS, Mannino DM. Global burden of COPD: systematic review and meta-analysis. Eur Respir J. 2006; 28(3):523–32.
6. Hogg JC, Timens W. The pathology of chronic obstructive pulmonary disease. Annu Rev Pathol. 2009; 4:435–59.
7. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med. 2006; 3(11):e442.
8. Pelkonen M. Smoking: relationship to chronic bronchitis, chronic obstructive pulmonary disease and mortality. Curr Opin Pulm Med. 2008; 14(2):105–9.
9. Sundblad BM, Larsson K, Nathell L. High rate of smoking abstinence in COPD patients: Smoking cessation by hospitalization. Nicotine Tob Res. 2008; 10(5):883–90.

10. Jindal SK, Gupta D, Aggarwal AN. Guidelines for Management of Chronic Obstructive Pulmonary Disease (COPD) in India: A Guide for Physicians (2003). Indian J Chest Dis Allied Sci. 2004; 46:137–153
11. World Health Organization. Global surveillance, prevention and control of chronic respiratory diseases. Geneva: World Health Organization; 2007.
12. Yin P, Jiang CQ, Cheng KK, Lam TH, Lam KH, Miller MR, et al. Passive smoking exposure and risk of COPD among adults in China: the Guangzhou Biobank Cohort Study. Lancet. 2007; 370(9589):751–7.
13. Regional COPD Working Group. COPD prevalence in 12 Asia-Pacific countries and regions: projections based on the COPD prevalence estimation model. Respirology. 2003; 8:192–8.

MINI LECTURE 3: Tobacco and Asthma

1. Adis Data Information BV. Smoking has a negative impact on asthma and alters the response to some asthma therapies. Drugs Ther Perspect. 2006; 22(2).
2. Austin JB, Selvaraj S, Godden D, Russell G. Deprivation, smoking, and quality of life in asthma. Arch Dis Child. 2005; 90(3):253–7.
3. Baena-Cagnani CE, Gomez RM, Baena-Cagnani R, Canonica GW. Impact of environmental tobacco smoke and active tobacco smoking on the development and outcomes of asthma and rhinitis. Curr Opin Allergy Clin Immunol. 2009; 9(2):136–40.
4. Global Burden of Asthma: Global Initiative for Asthma 2004.
5. Haughney J, Price D, Kaplan A, Chrystyn H, Horne R, May N, et al. Achieving asthma control in practice: understanding the reasons for poor control. Respir Med. 2008; 102(12):1681–93.
6. Lai CK, Beasley R, Crane J, Foliaki S, Shah J, Weiland S. Global variation in the prevalence and severity of asthma symptoms: phase three of the International Study of Asthma and Allergies in Childhood (ISAAC). Thorax. 2009; 64(6):476–83.
7. Murthy KJR, Sastry JG. Economic burden of asthma. Available at: http://www.whoindia.org/LinkFiles/Commision_on_Macroeconomic_and_Health_Bg_P2_Economic_burden_of_asthma.pdf (Accessed: April 10, 2010).
8. Paramesh H. Epidemiology of asthma in India. Indian J Pediatr. 2002; 69:309–12.
9. Shavit O, Swern A, Dong Q, Newcomb K, Sazonov Kocevar V, Taylor SD. Impact of smoking on asthma symptoms, healthcare resource use, and quality of life outcomes in adults with persistent asthma. Qual Life Res. 2007; 16(10):1555–65.
10. Thomson NC, Chaudhuri R, Livingston E. Asthma and cigarette smoking. Eur Respir J. 2004; 24(5):822–33.
11. Thomson NC, Spears M. The influence of smoking on the treatment response in patients with asthma. Curr Opin Allergy Clin Immunol. 2005; 5(1):57–63.
12. World Health Organization. Global surveillance, prevention and control of chronic respiratory diseases. Geneva: World Health Organization; 2007.
13. Mitchell EA, Stewart AW. The ecological relationship of tobacco smoking to the prevalence of symptoms of asthma and other atopic diseases in children: the International Study of Asthma and Allergies in Childhood (ISAAC). Eur J Epidemiol 2001;17:667–73.
14. Thomson NC, Chaudhuri R, Livingston E. Asthma and cigarette smoking. Eur Respir J. 2004; 24(5): 822–33.

2. INSTRUCTOR KEY RESOURCES/REFERENCES

1. Bates MN, Khalakdina A, Pai M, Chang L, Lessa F, Smith KR. Risk of tuberculosis from exposure to tobacco smoke: a systematic review and meta-analysis. Arch Intern Med. 2007; 167(4):335–42.
2. Pelkonen M. Smoking: relationship to chronic bronchitis, chronic obstructive pulmonary disease and mortality. Curr Opin Pulm Med. 2008; 14(2):105–9.
3. Thomson NC, Chaudhuri R, Livingston E. Asthma and cigarette smoking. Eur Respir J. 2004; 24(5):822–33.
4. World Health Organization. Global surveillance, prevention and control of chronic respiratory diseases. Geneva: World Health Organization; 2007.

3. SUPPORT KEY REFERNCES

1. Bates MN, Khalakdina A, Pai M, Chang L, Lessa F, Smith KR. Risk of tuberculosis from exposure to tobacco smoke: a systematic review and meta-analysis. Arch Intern Med. 2007; 167(4):335–42.
2. Pelkonen M. Smoking: relationship to chronic bronchitis, chronic obstructive pulmonary disease and mortality. Curr Opin Pulm Med 2008;14(2):105–9.
3. Thomson NC, Chaudhuri R, Livingston E. Asthma and cigarette smoking. Eur Respir J. 2004; 24(5):822–33.
4. World Health Organization. Global surveillance, prevention and control of chronic respiratory diseases. Geneva: World Health Organization; 2007.

4. INSTRUCTOR WEB-SITE RESOURCES

1. World Health Organization, Tobacco Free Initiative. WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco. Available at: http://www.who.int/tobacco/en/index.html

SAMPLE EXAMINATION QUESTIONS

Question 1 – Which of the following statements about the association between smoking and tuberculosis is incorrect?

A. Cigarette smoke decreases immune responses and increases the chance of TB infection.
B. Smoking is associated with a higher chance of mortality among TB patients.
C. Cigarette smoke increases phagocyte activities.
D. Cigarette smoke decreases release of proinflammatory cytokines.

ANSWER = C

Question 2 – True/False: Cigarette smoke decreases respiratory mucosal permeability.

ANSWER = False

Question 3 – Which of the following changes can follow structural changes in the respiratory tract due to smoking?

1. Peribronchiolar inflammation and fibrosis
2. Mucosal permeability increases and changes in pathogen adherence
3. Impaired mucociliary clearance
4. Disrupted respiratory epithelium
5. 1, 2, 3, and 4 are correct

ANSWER = 5 (1, 2, 3, and 4 are correct)

Question 4 – True/False: Passive smoking does not increase the risk of TB infection in children.

ANSWER = False

Question 5 – Which of the following effects is not associated with smoking in TB patients?

A. Smoking increases the risk of pulmonary TB.
B. Smoking enhances clinical manifestations of TB infection.
C. Smoking decreases the chance of cavitary TB.
D. Smoking increases the risk of getting a positive TB-smear.

ANSWER = C

Question 6 – True/False: Nicotine can reactivate latent mycobacterium tuberculosis by down-regulation of TNF-α by the macrophages in the lungs.

ANSWER = True

Question 7 – True/False: Iron loading promotes overgrowth of M. tuberculosis in bronchoalveoral macrophages and decreases the phagocytosis ability of macrophages.

ANSWER = True