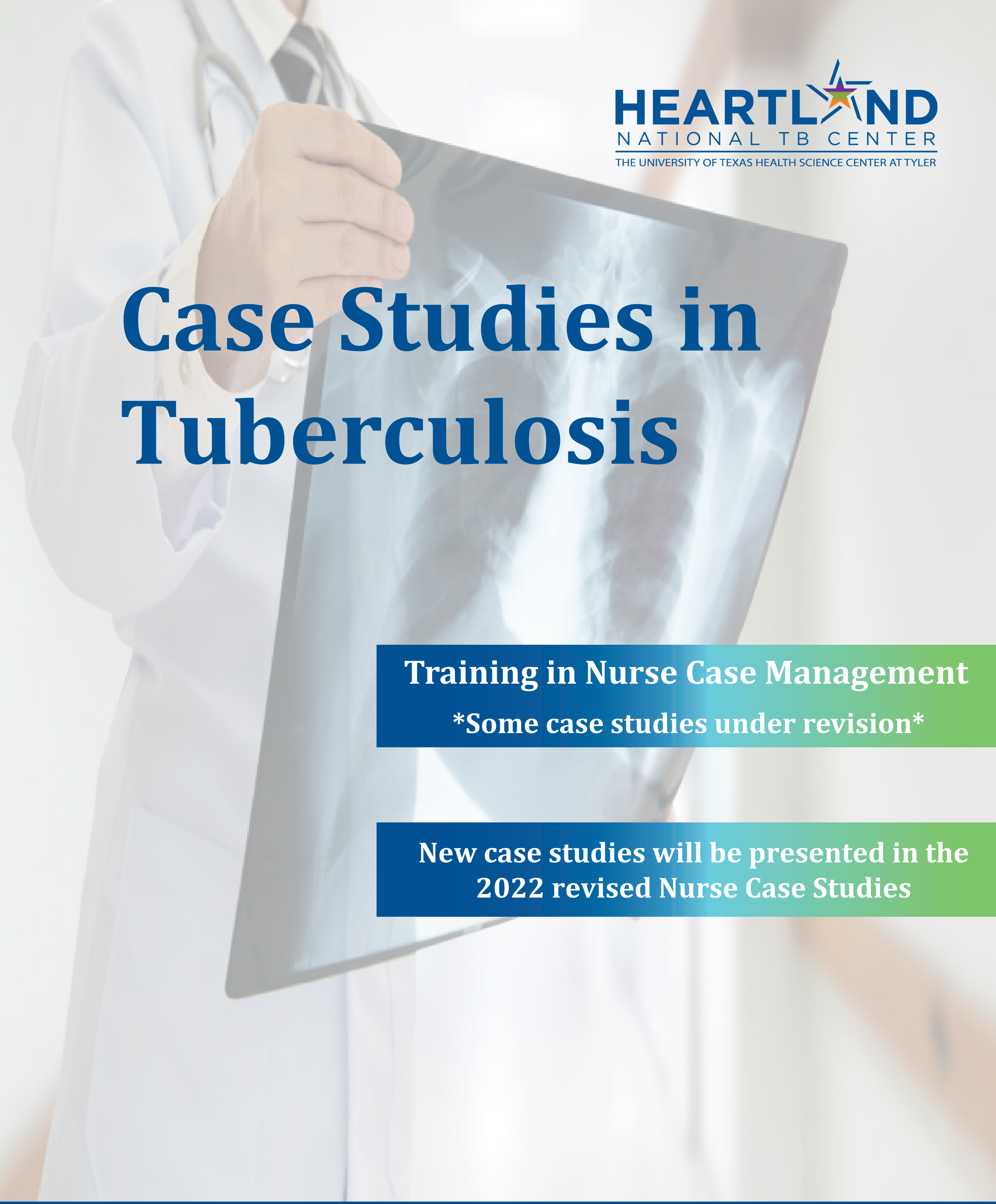

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Case Studies in Tuberculosis

Training in Nurse Case Management

Some case studies under revision

New case studies will be presented in the 2022 revised Nurse Case Studies

EXCELLENCE | EXPERTISE | INNOVATION

Dear Healthcare Professional,

Prior to reveiwing the content of this book, it is highly recommended to complete the Centers for Disease Control and Prevention (CDC) Self-Study Modules on Tuberculosis (TB). The modules contain basic information regarding transmission, pathogenesis, epidemiology, testing, infection control, managing adherance, patient rights, contact investigations, and outbreak detections. You can access the modules at www.cdc.gov/tb/education/ssmodules/default.htm.

Seldom does patient-care follow the relatively straight-forward path outlined in the CDC Self-Study Modules on TB. Due to this, the case studies in this book are designed to provide guidance and relevant reference material to gain insight into challenges faced in TB case management. Patients have multiple barriers to accurate diagnosis and completion of therapy, and public health nurses must develop skills in problem solving to successfully treat and care for a patient with TB infection or TB disease.

The studies in this book are based on real-life experiences of TB nurses in the Heartland region and beyond. They are designed to illustrate key concepts in TB prevention and care and can be used to train new nurses and other healthcare providers who are inexperienced in TB case management.

Suggested citation: Heartland National Tuberculosis Center, *Case Studies in Tuberculosis: Training in Nurse Case Management.*

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Heartland National Tuberculosis Center is funded by the Centers for Disease Control and Prevention.

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How to Use This Book

This collection of nursing case studies and their accompanying tools are intended to complement a TB program's education and training of its nursing staff. It can be incorporated into new employee introduction and training on TB case management; used as a continuing education tool for current employees; or as an individual learning tool.

Suggested Group Training

The individual nursing cases should be copied and distributed to the group. Cases do not need to be taught in the order presented in the manual. Specific cases may be pulled out to instruct on a particular programmatic issue.

The group leader or instructor should have a copy of the answers and if possible, a copy of each corresponding reference for each lesson. The case study should be read aloud; the instructor should stop to ask the group the questions and facilitate the answers using the references to underscore the learning point. Answers to the questions should be made available to the group after the discussion.

It is recommended that a copy of the references be readily available to the TB program staff both as a supplemental learning tool and as a future resource.

Suggested Individual Training: Part of a Structured Program of Employee Learning

This product can be used for individually structured training. It can be used to orient new employees; as part of a continuing education system; or a re-teaching tool when specific issues arise. A schedule of completion can be devised by the training coordinator and mutually agreed upon by the trainee(s).

The individual nursing cases should be copied and distributed as arranged by the trainer. A copy of the corresponding references should be available at the same time.

As an individual works through a case study, it is preferable that the case questions first be answered by the trainee and then shared with the trainer – discussing the learning points and clarifying any incorrect answers using the corresponding references.

A less reinforcing method (in the interest of time) is to have the trainer supply the answers to the trainee AFTER they have completed the case study and have the trainee follow up errors by reviewing the corresponding references.

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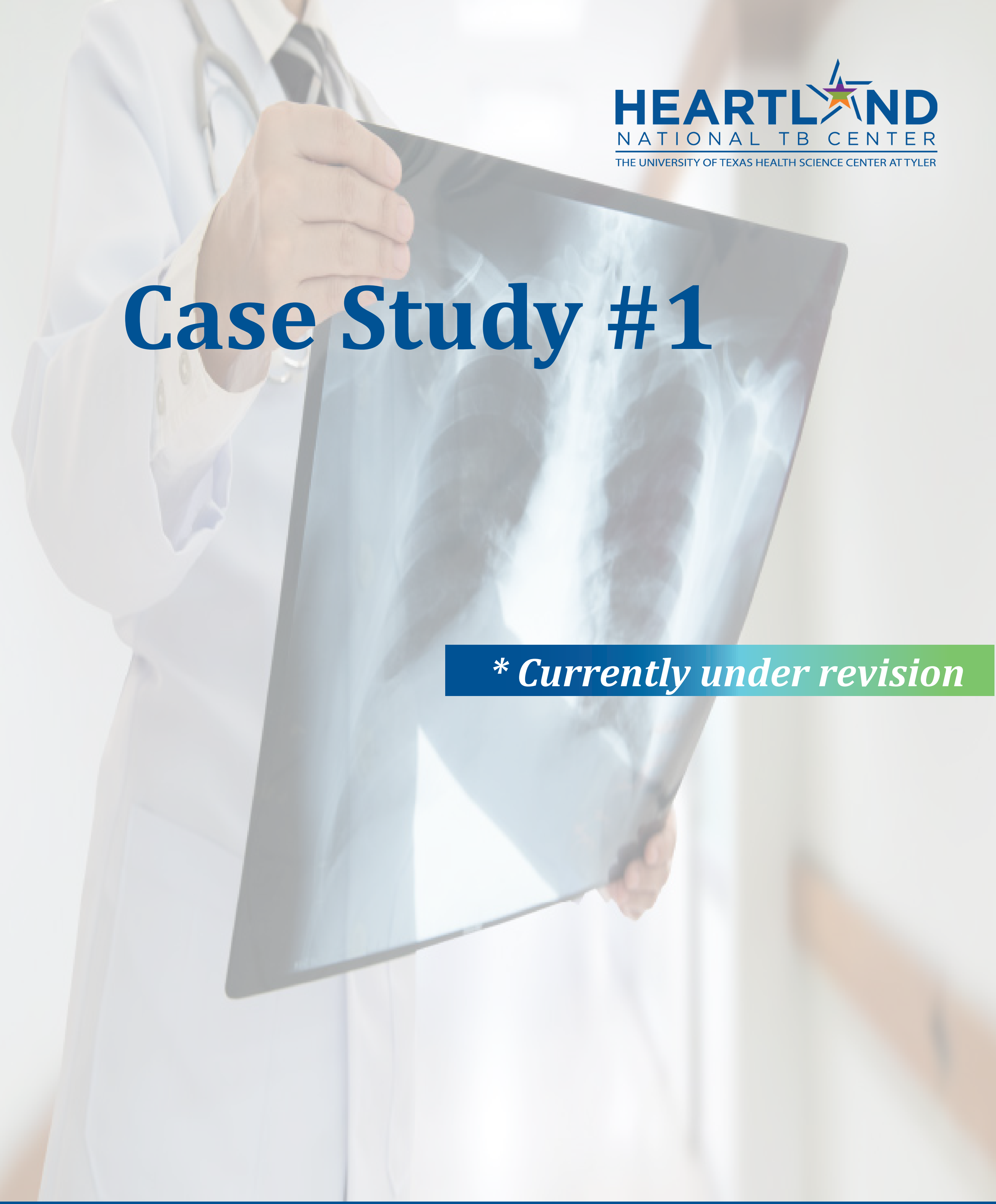
Acronyms and Abbreviations

AFB	Acid-fast Bacilli
AII	Airborne Infection Isolation
ALT	Alanine Aminotransferase
ART	Antiretroviral Therapy
AST	Aspartate Aminotransferase
ATS	American Thoracic Society
BCG	Bacille Calmette-Guérin
BPH	Benign Prostatic Hypertrophy
CBC	Complete Blood Count
CDC	Centers for Disease Control and Prevention
CNE	Continuing Nursing Education
CT	Computed tomography
CXR	Chest X-ray
DOT	Directly Observed Therapy
DST	Drug Susceptibility Testing
ED	Emergency Department
EKG	Electrocardiogram
EMB	Ethambutol
ESR	Erythrocyte Sedimentation Rate
GI	Gastrointestinal
HepBsAg	Hepatitis B Surface Antigen
HIV	Human Immunodeficiency Virus
HNTC	Heartland National Tuberculosis Center
IGRA	Interferon Gamma Release Assay
INH	Isoniazid
LFT	Liver Function Test
LTBI	Latent Tuberculosis Infection
M. bovis	*Mycobacterium bovis*
MDR-TB	Multidrug-resistant Tuberculosis
MTBC	*Mycobacterium tuberculosis complex*
M. tb	*Mycobacterium tuberculosis*
NAAT	Nucleic Acid Amplification Test
PA	Posteroanterior
PSA	Prostate Specific Antigen
PZA	Pyrazinamide
QFT-G	QuantiFERON®-TB Gold
QFT-GIT	QuantiFERON®-TB Gold In Tube
RFB	Rifabutin
RIF	Rifampin
TNF	Tumer Necrosis Factor
TB	Tuberculosis
TBI	Tuberculosis Infection
TID	Three times a day
TST	Tuberculin Skin Test
U.S.	United States



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Case Study #1

** Currently under revision*

Case Study 1

Currently under revision
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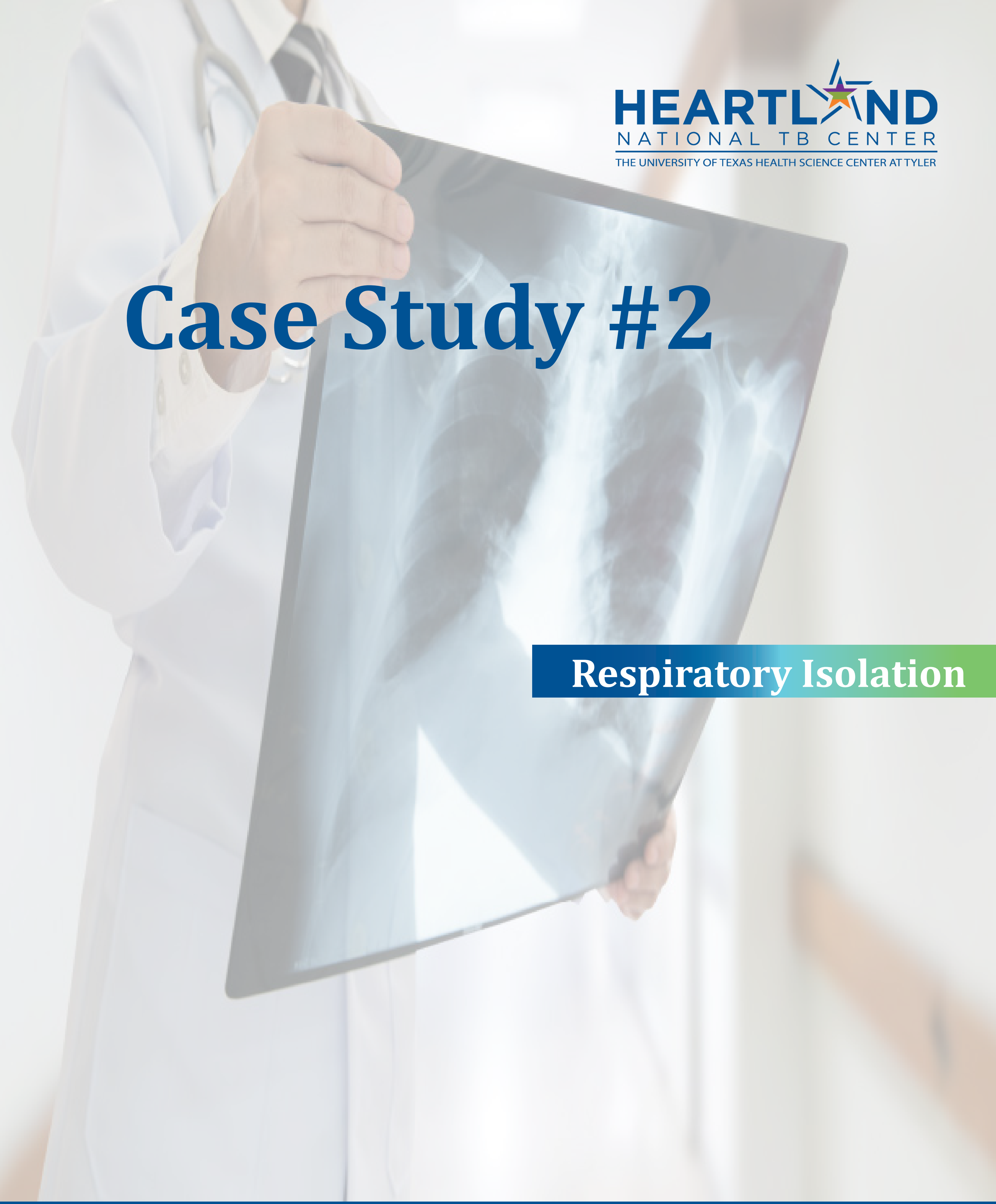

Case Study #2

Respiratory Isolation

Case Study 2

Respiratory Isolation

A 31-year-old caucasian male presented to the Emergency Department (ED) after experiencing gross hemoptysis. He had a 2 month history of productive cough, a 25 pound weight loss, night sweats, and fatigue. A CXR revealed bilateral cavitary infiltrates. The initial sputum specimen was smear positive 4+ (see Appendix A) and was submitted for a Nucleic Acid Amplification Test (NAAT), culture, and sensitivity. The patient has a history of heavy alcohol and drug use. He is HIV negative, Hepatitis B and C positive, has a long history of cigarette use, and a chronic smoker's cough. The patient resides with his wife and three children (ages 9, 7, and 2 years old).

1) The patient was admitted to the hospital, should he be placed in an Airborne Infection Isolation (AII) room?

A. No, TB has not been confirmed yet.
B. No, he should be admitted to a private room because he probably has lung cancer and isolation would be too distressing.
C. No, he can be admitted into a shared room.
D. Yes, he should be placed in an AII room.

The patient's NAAT was positive for *M. tuberculosis*. He was immediately started on a standard four drug regimen and tolerated the medications well. After four days of hospitalization the physician called the local health department to report the person with TB disease and his intention to discharge the patient with a prescription for INH, RIF, PZA, EMB, and vitamin B6.

2) What is the appropriate response for the request to discharge?

A. Document the patient information, fill the prescription as ordered and proceed with discharge plans.
B. Document the patient information and inform the physician that the patient cannot be discharged until the prescription is filled by the local health department.
C. Document the patient information and inform the physician that the patient does not meet the standard criteria for discharge.
D. Document the patient information and discharge the patient with a follow-up appointment to the local health department.

The patient was fairly cooperative during the first week of hospitalization, however, the nursing staff reported the patient had been out in the hallway a couple of times without his mask. The hospital staff was becoming anxious, so the physician called the local health department to coordinate the discharge.

The patient was visited in the hospital by a nurse from the local health department to coordinate his discharge. Based on recommendations from the local health department, the mother made arrangements to have the children stay next door with their grandmother as a precaution.

3) What is the appropriate response to the physician's request for discharge?

A. Agree to coordinate discharge as long as the patient is on DOT.
B. Advise the physician to delay discharge until 3 consecutive negative smears are received, patient has received a minimum of 10 days of treatment, and is clinically improving; or home arrangements have been made.
C. Agree to coordinate the discharge since the patient is a nuisance in the hospital and keeping him there is doing more harm than good.
D. Deny discharge until susceptibilities are known.

4) Regarding respiratory isolation precautions, what is an important task of this hospital visit?

A. Educate the patient on TB infection control (home isolation precautions) in the home.
B. To avoid a missed dose, have TB medications ready for the patient.
C. Confirm that the patient completely understands the pathophysiology and transmission of TB.
D. Establish a referral for smoking cessation classes.

The patient was discharged home, and was adherent to home isolation precautions during the first week. Sputa were obtained by the local health department during his first week home, the results were still positive (1+ AFB smear, 0 AFB smear, 1+ AFB smear) and home isolation continued. At the next visit the patient was not home. The wife shared that "he got stir crazy," went drinking with his friends Friday night, and has not been back since.

5) What should the local health department do at this point?

A. Ask the wife's assistance in locating the patient and leave contact information with instructions to call the local health department when the patient returns.
B. Leave TB medications with the wife for the patient to self-administer.
C. Report patient to police.
D. No action needed.

Two weeks later, the patient was found at a relative's house. After re-educating the patient, he was adherent to the respiratory isolation precautions. During this time, three consecutive sputa results were reported as negative, his symptoms improved and he remained on an appropriate TB treatment regimen for two weeks. At that point, the local health department discontinued respiratory isolation precautions (see Appendix B).

Reflection

In this scenario, the patient presented to the ED with symptoms consistent with TB and was evaluated appropriately by the ED physician. Due to his positive AFB smears and his potential to infect others, the patient was immediately placed in an AII room. Because TB is a communicable disease additional criteria is required prior to discharge. The local health department should encourage the hospital to refrain from discharging the patient until three consecutive sputa results are received. However there may be situations that the local health department will need to work with the patient in making alternative living arrangements in the event that he/she is discharged prior to receiving negative results. Further, if the patient is released prior to negative results, the patient is considered contagious and it is the responsibility of the local health department to locate the patient and place him back on respiratory isolation precautions.

ANSWERS

1) **The patient was admitted to the hospital, should he be placed in an Airborne Infection Isolation (AII) room?**

   Answer: D. Yes, he should be placed in an AII room.

   Rationale: The patient is AFB smear positive 4+, which suggests that he is probably very infectious and should be isolated in a room with proper environmental controls for airborne precautions.[1]

2) **What is the appropriate response for the request to discharge?**

   Answer: C. Document the patient information and inform the physician that the patient does not meet the standard criteria for discharge (see Appendix C).

   Rationale: The patient does not meet the criteria for discharge from hospitalization to the home with high-risk individuals. He has not had three consecutive negative smears, has not received medications for a minimum of 10 days, and documentation of clinical improvement has not been noted.[7]

3) **What is the appropriate response to the physician's request?**

   Answer: B. Advise the physician to delay discharge until 3 consecutive negative smears are received, patient has received a minimum of 10 days of treatment, and is clinically improving; or home arrangements have been made.

   Rationale: Local health departments are pressured to agree to discharge patients for various reasons. Pediatric patients exposed to TB are at high risk of developing severe forms of TB disease once infected; advocating for their protection is a critical role for public health.[7]

4) **Regarding respiratory isolation precautions, what is an important task of this hospital visit?**

   Answer: A. Educate the patient on TB infection control (home isolation precautions) in the home (see Appendix C).

   Rationale: It is important to educate the patient on steps to take to prevent the further spread of TB while in home isolation. Education should include instructions on cough etiquette, isolating self to a room, and/or not allowing visitors into their home until they are no longer infectious.[4]

5) **What should the local health department do at this point?**

   Answer: A. Ask the wife's assistance in locating the patient and leave contact information with instructions to call the local health department when the patient returns.

   Rationale: It is important to reinstitute home isolation because the patient has documented signs of TB disease and remains infectious despite treatment.[4]

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[4] Centers for Disease Control and Prevention. (2013). *Core curriculum on Tuberculosis: What the clinician should know, 5th ed.* Atlanta, GA: US Department of Health and Human Services, CDC.

[7] Centers for Disease Control and Prevention. *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings.* MMWR 2005b; 54 (No. RR-17). Retrieved from https://www.cdc.gov/mmwr/pdf/rr/rr5417.pdf

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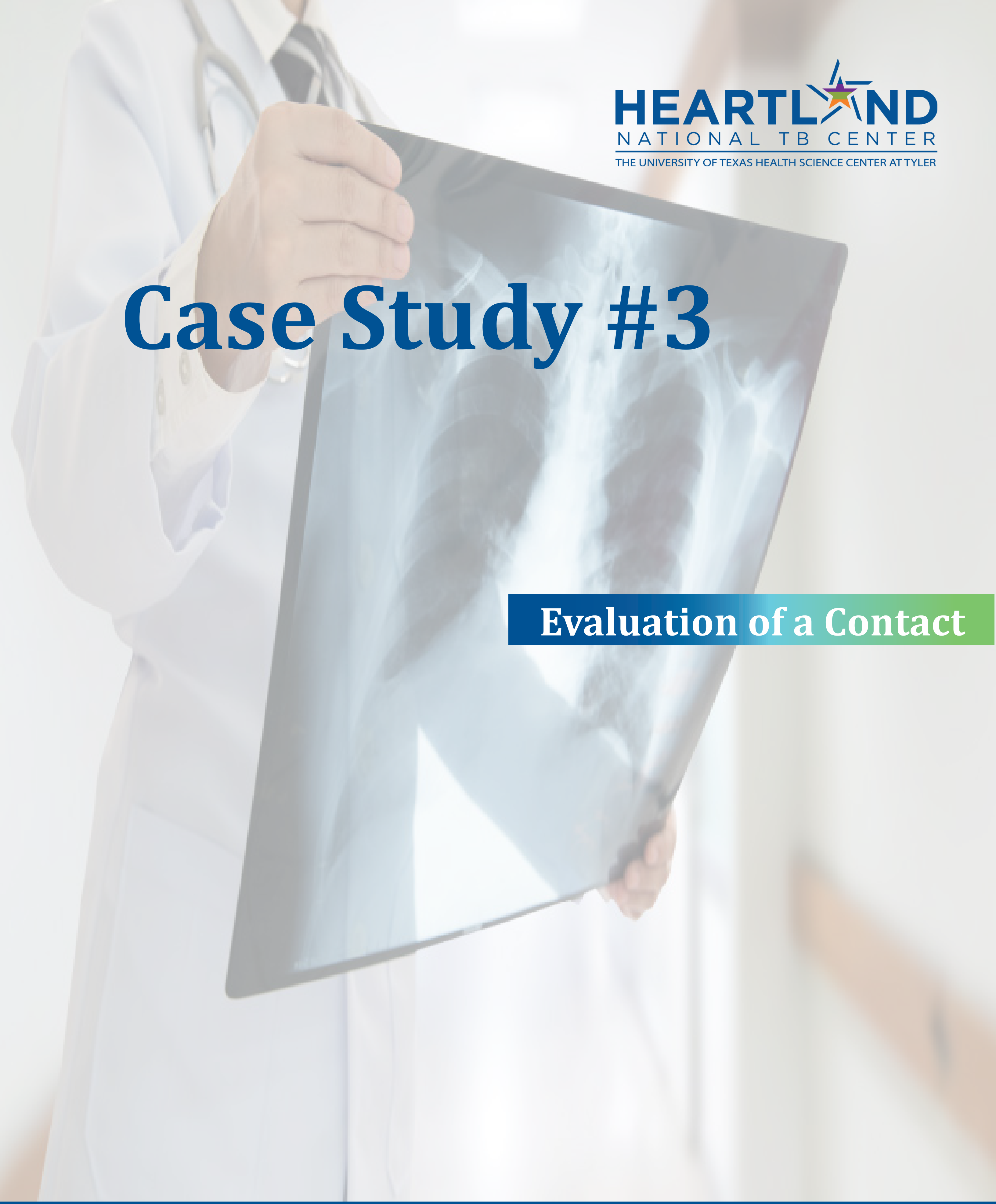

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Case Study #3

Evaluation of a Contact

Case Study 3

Evaluation of a Contact to a Patient with Pulmonary TB

A 20 year old Marshallese woman was identified and screened during a contact investigation. She provided documentation of TST results she received two years ago prior to her admission into school which indicated she was negative with a 0 mm induration. Her current skin test is indurated at 6 mm. She denies any symptoms of cough, fatigue, night sweats, chills, or fever but did report an unintended weight loss of 14 pounds.

1) How do we interpret the TST reaction?

A. Negative, she is foreign-born and it is less than 10 mm.
B. Positive, she is a contact to a TB patient with pulmonary disease.
C. Negative, there is <10 mm difference in reaction size from her previous TST.
D. Positive, any change in TST induration should be interpreted as positive.

2) What places her at high risk for TB disease?

A. Age
B. She is foreign-born.
C. Recent contact to a person with active TB disease.
D. Both B and C

She was referred for a CXR and medical evaluation. Her CXR report was abnormal with cavitary lesion in the left apex with left apical pleural thickening and her medical examination revealed no significant findings. Given her multiple risk factors for TB disease, she is placed in respiratory isolation and instructed to provide sputa. She is unable to provide a natural sputum specimen, even with coaching.

3) What is the next appropriate action by the local health department nurse?

A. Do nothing, if she cannot produce a sputum she likely doesn't have TB disease.
B. Start her on treatment for TB infection.
C. Arrange for a sputum induction.
D. Start her on treatment for TB disease.

With the help of induction, she is able to provide one sputum sample which was reported back as AFB-smear negative. The physician initiated standard four drug regimen based on radiographic abnormality, positive skin test and significant weight loss.

4) Is this patient considered infectious?

A. This patient could potentially be infectious.
B. This patient is not infectious since her sputum was AFB smear negative.
C. This patient is not infectious since she has only extrapulmonary TB.
D. This patient is not infectious since her sputum had to be induced.

5.) Should a contact investigation be initiated?

A. No, she is already part of a contact investigation.
B. No, culture confirmation has not been received.
C. No, her sputum was negative.
D. Yes, she is a secondary case of TB.

Reflection

In this scenario, the local health department has identified a contact to a patient diagnosed with pulmonary TB. The contact was initially evaluated with a TST and a symptom screening. Although the contact is foreign born and there was less than a 10 mm difference between her previous TST and her current one, any person identified during a contact investigation with a TST induration > 5 mm is considered positive. Along with her risk factors for TB disease her abnormal CXR report changes her classification from a contact to a potential secondary case of TB. Often when patients are asymptomatic, they are unable to produce sputa spontaneously and must be coached. Coaching can include demonstrating deep breathing techniques such as huffing and physically repositioning the patient for optimal production of sputa. If after proper coaching, the patient is unable to produce a natural sputa the local health department should arrange for a sputum induction. It is important to recognize that a patient with one AFB smear negative result does not meet the requirement for determining potential infectiousness, regardless of the patient's inability to produce a sputa naturally. Given that she is being considered for pulmonary TB, has negative AFB sputum smears, and a cavitaty CXR, a contact investigation surrounding this patient should be initiated.

Answers

1) **How do we interpret the TST reaction?**

   Answer: B. Positive, she is a contact to a TB patient with pulmonary disease.

   Rationale: This patient is considered TST positive with a TST $\geq$5 mm and known recent contact to a person with infectious TB disease (see Appendix D).[1]

2) **What places her at high risk for TB disease?**

   Answer: D. Both B and C.

   Rationale: People at high risk for progressing to TB disease after becoming infected with *M. tuberculosis* includes those identified in a contact investigation and foreign-born persons from areas with high incidence of TB.[17]

3) **What is the next appropriate action by the local health department nurse**

   Answer: C. Arrange for a sputum induction.

   Rationale: A sputum induction procedure should be arranged for patients who are unable to produce a natural sputum specimen.[4]

4) **Is this patient considered infectious?**

   Answer: A. This patient could potentially be infectious.

   Rationale: A cavity in the lung is one of many factors associated with infectiousness.[4]

5) **Should a contact investigation be initiated?**

   Answer: D. Yes, she is a secondary case of TB.

   Rationale: A contact invetigation should be initiated for a person suspected of pulmonary tuberculosis with a cavitary CXR.[6]

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4. Centers for Disease Control and Prevention. (2013). *Core curriculum on Tuberculosis: What the clinician should know*, 5th ed. Atlanta, GA: US Department of Health and Human Services, CDC. Retrieved from https://www.cdc.gov/tb/education/corecurr/pdf/corecurr_all.pdf

6. Centers for Disease Control and Prevention. *Guidelines for the Investigation of Contacts of Persons with Infectious Tuberculosis: Recommendations from the National Tuberculosis Controllers Association and CDC*, United States. MMWR 2005a; 54 (No. RR-15). Retrieved from https://www.cdc.gov/mmwr/pdf/rr/rr5415.pdf

17. Nahid, P., Dorman, S.E., Alipanah, N., Barry, P.M., Brozek, J.L., Cattamanchi, A., Chaisson, L.H., Chaisson, R.E., Daley, C.L., Grzemska, M., Higashi, J.M., Ho, C.S., Hopewell, P.C., Keshavjee, S.A., Lienhardt, C., Menzies, R., Merrifield, C., Narita, M., O'Brien, R., Peloquin, C.A., Raftery, A., Saukkonen, J., Schaaf, H.S., Sotgiu, G., Starke, J.R., Migliori, G.B., Vernon, A.; *Executive Summary: Official American Thoracic Society/ Centers for Disease Control and Prevention/Infectious Diseases Society of America Clinical Practice Guidelines: Treatment of Drug-Susceptible Tuberculosis*. Clin Infect Dis 2016; 63 (7): 853-867. doi: 10.1093/cid/ciw566

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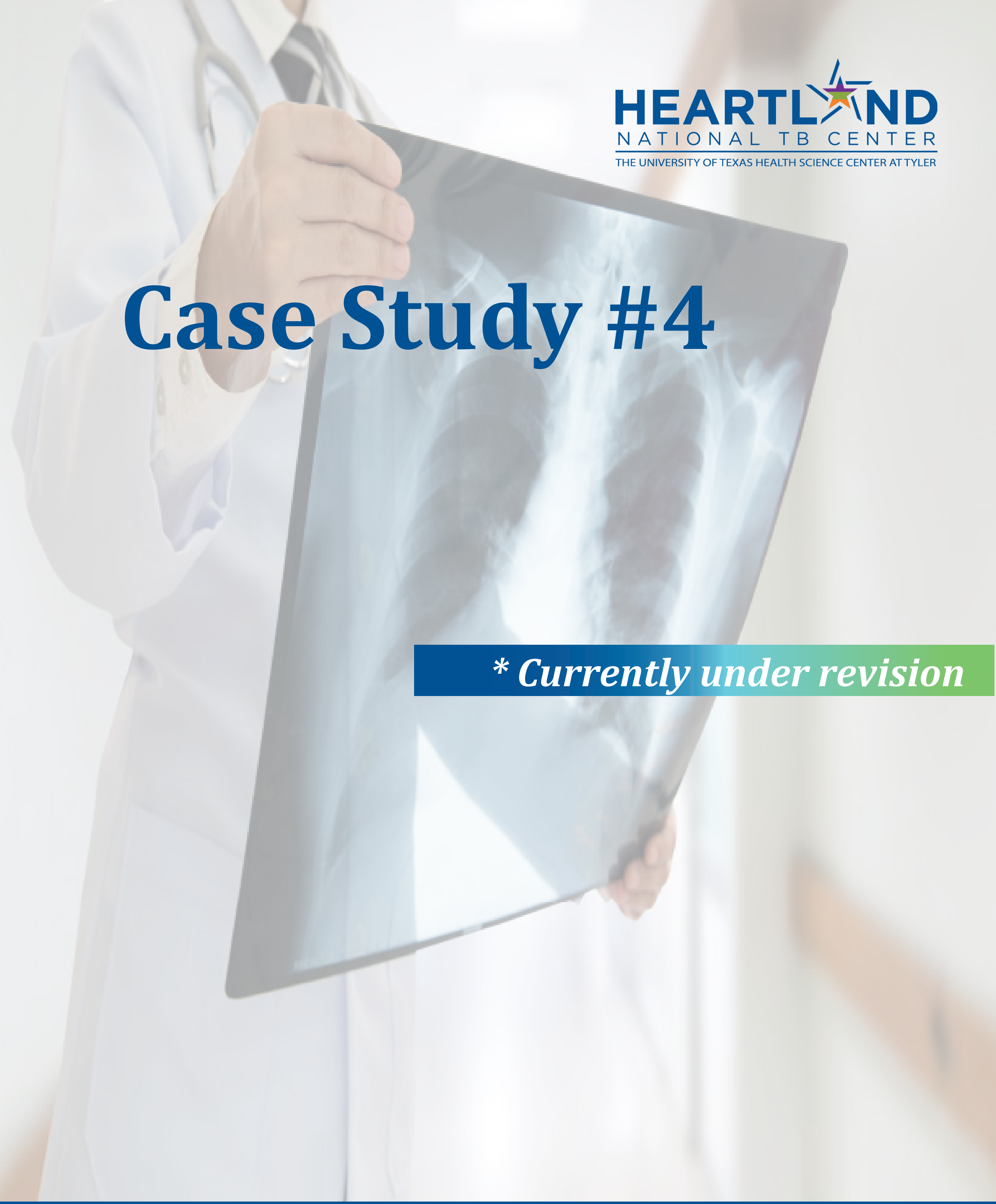

Case Study #4

** Currently under revision*

Case Study 4

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Case Study #5

* Currently under revision

Case Study 5

Currently under revision

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Case Study #6

Pediatric Tuberculosis

Case Study 6

Pediatric Tuberculosis

A 15-year-old male presented to his primay care physician with frequent cough, weight loss, fatigue, and night sweats for four months. Two months ago he was treated for bronchitis that was unresolved. His CXR showed extensive right upper lobe infiltrates and multiple cavitary lesions. TB was suspected and a TST was placed and read at 25 mm induration. Patient was referred to a pediatric pulmonologist.

The pulmonologist collected sputum specimens that were positive with numerous AFB. The patient was accompanied by his mother and 5 month old brother when the pulmonologist initially saw this patient and suspected active TB. The infant appeared healthy with no signs and symptoms of TB. The pulmonologist immediately reported the 15 year old and infant brother to the local health department.

1) Regarding the infant brother, which is the most appropriate response by the local health department?

A. No action necessary at this time, the infant is not symptomatic and in no immediate danger.
B. The infant may be infected with TB, but it is premature to react until the older brother is confirmed to actually have active TB.
C. The infant has had household contact with an active case of TB. This is an urgent public health matter and the infant should be evaluated as soon as possible.
D. The infant probably has been exposed and should immediately be scheduled to have gastric aspirates collected.

The local health department nurse visited the home of the teenager and infant and placed TSTs on all the household members including the infant. The nurse and the mother worked together to schedule a CXR (PA and lateral views) and physical exam for the infant that same week.

2) Which statement is most accurate with regard to infants and children exposed to TB?

A. Infants and children are highly prone to developing symptoms of active TB.
B. At least half of infants and children diagnosed with active TB who are found in contact investigations are not symptomatic at time of diagnosis.
C. Infants and children with active TB are frequently infectious because of increased upper respiratory secretions.
D. Infants and children are very resilient and do not typically develop active TB.

In 48 hours the nurse returned to the home and read all TSTs. Everyone in the household (mom, dad, 9 year old brother and 12 year old brother) was TST positive. The infant was TST negative.

3) What should the local health department nurse do next?

A. Cancel the CXR appointment since the infant is TST negative and CXRs are traumatic for infants.
B. Keep the CXR appointment since a negative TST in 5 month old infants does not rule out infection.
C. Postpone the CXR appointment until the older brother is confirmed to have TB.
D. Review signs and symptoms of TB and only do a CXR if the infant becomes symptomatic.

The local health department nurse called the morning of the appointment for the infant's CXR and the mother said that she could not make the appointment because she had no gas in her car and could not afford the gas for the appointment. She was not concerned because the infant appeared to be fine.

4) How should the nurse handle this situation?

A. Agree with the mother and instruct her to call if the infant develops symptoms.
B. Agree with the mother and say that you will check on the infant next week.
C. Report the mother to Family Services for child endangerment.
D. Assist the mother with enablers so she can keep the appointment.

An enabler (gas card) was provided to the patient and the mother was able to keep the appointment. The CXR was performed and the infant had a significant right middle lobe infiltrate and decreased breath sounds on the right. The pulmonologist performed a bronchoscopy and diagnosed endobronchial TB – a rare form of TB that affects the bronchus and often occludes bronchial tubes. The physician immediately prescribed treatment for active TB disease with the standard four drug regimen – INH, RIF, PZA, and EMB in pediatric doses by DOT.

5) What should the health department do?

A. Do not worry about it, the doctor is experienced in pediatric TB and knows what he/she is doing.
B. Assess the infant's visual acuity before treatment.
C. Look for strategies to administer medications to the pediatric patient.
D. Provide instructions to the mother for administering medications to the infant.

The nurse reached out to the pharmacy to compound the medications for the infant so that the mother could be included in the administration process. The local health department administrator was concerned about how much time and effort it was taking to treat this family for TB infection and active TB disease. The mother obviously cared very much for the children and wanted them to get better, so the administrator suggested that the mother provide DOT for the baby and the rest of the family.

6) What is the best response?

A. Agree with the administrator, the needs of this family must be balanced with the rest of the priorities at the local health department.
B. Explain to the administrator that DOT is the standard of care for all TB patients.
C. Train the mother to provide medications via DOT and ask her to notify the local health department if any problems with DOT occur.
D. Suggest continuing DOT through the initial phase of treatment and then allow the mother to monitor therapy for the continuation phase of treatment.

Reflection

Evaluation of the 5 month old brother should be regarded as a high priority regardless of presence of symptoms due to the shorter incubation period and risk of developing a severe form of TB. His medical evaluation should include a TST, and a PA and lateral CXR.

The mother shared with the local health department nurse that she was unable to keep the clinic appointment because she could not afford gas for her car. The nurse used an enabler (gas card) as a case management intervention, which allowed the mother to keep the clinic appointment. Enablers are resources that aid the patient in overcoming barriers to treatment.

Upon receipt of a treatment order, the local health department nurse should begin to look for strategies for administering medication for a pediatric patient. Any identified strategies should be discussed with the mother to determine what will yield the best results; keep in mind that you may need to alter your approach often.

Answers

1) **Regarding the infant brother, which is the most appropriate response by the local health department?**

   Answer: C. The infant has had household contact with an active case of TB. This is an urgent public health matter and the infant should be evaluated as soon as possible.

   > **Rationale:** Age <5 years is one of the most important factors in prioritizing contacts because TB disease is more likely to be severe with higher mortality rates (e.g. TB meningitis).[12]

2) **Which statement is most accurate with regard to infants and children exposed to TB?**

   Answer: B. At least half of infants and children diagnosed with active TB who are found in contact investigations are asymptomatic at time of diagnosis.

   > **Rationale:** Children may appear asymptomatic, however, at the same time they can have an abnormal CXR and disease that can progress rapidly to more severe forms of TB.[1]

3) **What should the local health department nurse do next?**

   Answer: B. Keep the CXR appointment since a negative TST in 5 month old infants does not rule out infection.

   > **Rationale:** A CXR and physical exam is needed to rule out active TB in this infant even if the TST induration is less than 5 mm in diameter.[12]

4) **How should the nurse handle this situation?**

   Answer: D. Assist the mother with enablers so she can keep the appointment.

   > **Rationale:** Health departments should have some assistance available to enable their clients to comply with medical appointments and be willing to provide them as needed. Some health departments provide gas cards or vouchers for taxi or bus fares, and others will allow employees to transport clients.[12]

5) **What should the health department do?**

   Answer: C. Look for strategies to administer medications to the pediatric patient.

   > **Rationale:** Treating a pediatric patient can present unique challenges. The local health department nurse should identify a treatment delivery method that uses easy-to-take preparations. [12]

6) **What is the best response?**

   Answer: B. Explain to the administrator that DOT is the standard of care for all TB patients.

   > **Rationale:** DOT should be conducted by the local health department staff and not delegated to a parent. The local health department staff may either administer the medications directly or observe a parent administering them, whatever is more acceptable for the child. [12]

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[1] American Academy of Pediatrics. (2015). Tuberculosis. In Kimberlin, D.W., Brady, M.T., Jackson, M.A., & Long, S.S., (Eds.), *Red Book: 2015 Report of the Committee on Infectious Diseases*, 30th ed. (pp. 804-831). Elk Grove Village, IL: American Academy of Pediatrics.

[12] Centers for Disease Control and Prevention. (2015). *Self-Study Modules on Tuberculosis 6-9*. Atlanta, GA: US Department of Health and Human Services, CDC. Retrieved from https://www.cdc.gov/tb/education/ssmodules/default.htm

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Case Study #7

Hepatotoxicity in TB Treatment

Case Study 7

Hepatotoxicity in TB Treatment

A 38 year old Latin American male was recently diagnosed with active tuberculosis while incarcerated. He was started on standard four drug therapy. Baseline lab values were ALT (SGPT) 42 units/L and AST (SGOT) 63 units/L. He was released from jail and his care was transferred to the local health department where an assessment revealed a social history of previous alcohol and cocaine use, bipolar disorder, and homelessness.

1) What increases his risk of hepatotoxicity while taking TB medications?

A. Alcohol use
B. Cocaine use
C. Bipolar disorder
D. Homelessness

The local health department nurse educated the patient on the risks of alcohol use and hepatotoxicity. The sputum results that were collected in jail were reported as pan-susceptible, he was tolerating medications well and EMB was discontinued. During his follow up visit the patient complained that he was not feeling well.

2) What are early signs and/or symptoms associated with hepatotoxicity?

A. Abdominal tenderness, nausea, and fatigue
B. Jaundice and dark urine
C. Peripheral neuropathy and joint pain
D. All of the above

The nurse assessment further identified that he had bloating, nausea and fatigue. The patient admitted to drinking alcohol.

3) What should the local health department nurse do next?

A. Stop TB medications.
B. Do nothing, these are expected side effects of TB medications.
C. Hold medication. Draw labs that include LFTs.
D. Refer to a GI doctor.

His laboratory results revealed an increase in the ALT to 304 U/L and AST to 245 U/L. He was evaluated by the local health department physician, TB medications were stopped, he was instructed to return to the clinic for repeat labs, and he was re-educated to abstain from alcohol.

4) Which of the following statements is true of hepatotoxicity?

A. Drug-induced hepatitis is the most frequent serious adverse reaction of the first-line drugs.
B. Other causes of abnormal liver tests must be excluded before diagnosing drug-induced hepatitis.
C. If LFTs are consistent with hepatotoxicity, all hepatotoxic drugs-must be stopped.
D. All of the above.

5) What is the best approach to continue TB treatment?

A. Restart all the TB medications once LFTs are normal.
B. A drug rechallenge should be initiated once the ALT returns to <2x the upper limit of normal.
C. Discontinue TB treatment and have the patient follow-up every six months for symptoms of TB.
D. Refer the patient to an alcohol rehabilitation center and restart all TB medications.

Once the LFTs were <2x upper limits of normal the TB medications were restarted sequentially. The PZA was discontinued because it was identified as the cause for recent elevation in the ALT and treatment was continued with INH and RIF. The patient tolerated the medications well without any other side effects or adverse reactions and the treatment was extended to nine months.

Reflection

A drug re-challenge is reintroducing medications one at a time to determine which drug is causing the increase in liver function tests. The order of the re-challenge is as follows: start with RIF for approximately one week, if no increase in liver function tests then add INH for approximately one week, if no increase in liver function tests then add PZA and recheck labs after approximately one week. If symptoms recur or liver function tests increases, the last drug added should be stopped and the challenge should continue with the next drug. If any of the drugs other than PZA cannot be restarted without the LFTs rising, medical consultation should be considered to assure the patient is receiving a strong enough regimen to cure.

In this scenario, treatment was extended to nine months because the patient did not tolerate PZA. A regimen that does not include PZA for 2 months should be extend to 9 months.

Answers

1) **What increases his risk of hepatotoxicity while taking TB medications?**

   Answer: A. Alcohol use.

   Rationale: The consumption of alcohol while on anti-TB medications is known to cause liver injury and places the patient at an increased risk for hepatotoxicity.[1]3

2) **What are early signs and/or symptoms associated with hepatotoxicity?**

   Answer: A. Abdominal tenderness, nausea, and fatigue.

   Rationale: Some patients treated with the standard four-drug regimen may have symptoms of hepatotoxicity. Early signs and symptoms include unexplained anorexia, nausea, vomiting, fatigue, and abdominal tenderness.[14]

3) **What should the local health department nurse do next?**

   Answer: C. Hold medication. Draw labs that include LFTs.

   Rationale: If the patient is symptomatic, the nurse should hold medication. Routine LFTs are recommended prior to starting the standard four-drug therapy for a person with active TB disease. If the tests are normal, no further tests are required. If symptoms of hepatotoxicity develop during treatment or if the patient consumes alcohol, monthly LFTs are required.[14]

4) **Which of the following statements is true of hepatotoxicity?**

   Answer: D. All of the above.

   Rationale: INH, RIF and PZA are known to cause hepatotoxicity because these drugs are metabolized by the liver. It is important to exclude other causes of abnormal liver function tests (hepatitis A, B, C and history of any other liver disease or substance abuse) before diagnosing drug-induced hepatotoxicity. It is important to take an inventory of *all* medications (prescribed and over the counter) to identify all hepatotoxic agents. If signs and symptoms develop, consideration should be given to stopping all hepatotoxic medications.[14]

5) **What is the best approach to continue TB treatment?**

   Answer: B. A drug rechallenge should be initiated once the ALT returns to <2x the upper limit of normal.

   Rationale: Closely monitoring the patient during sequential reintroduction of drugs is used to identify the agent causing the adverse reaction (hepatotoxicity).[17]

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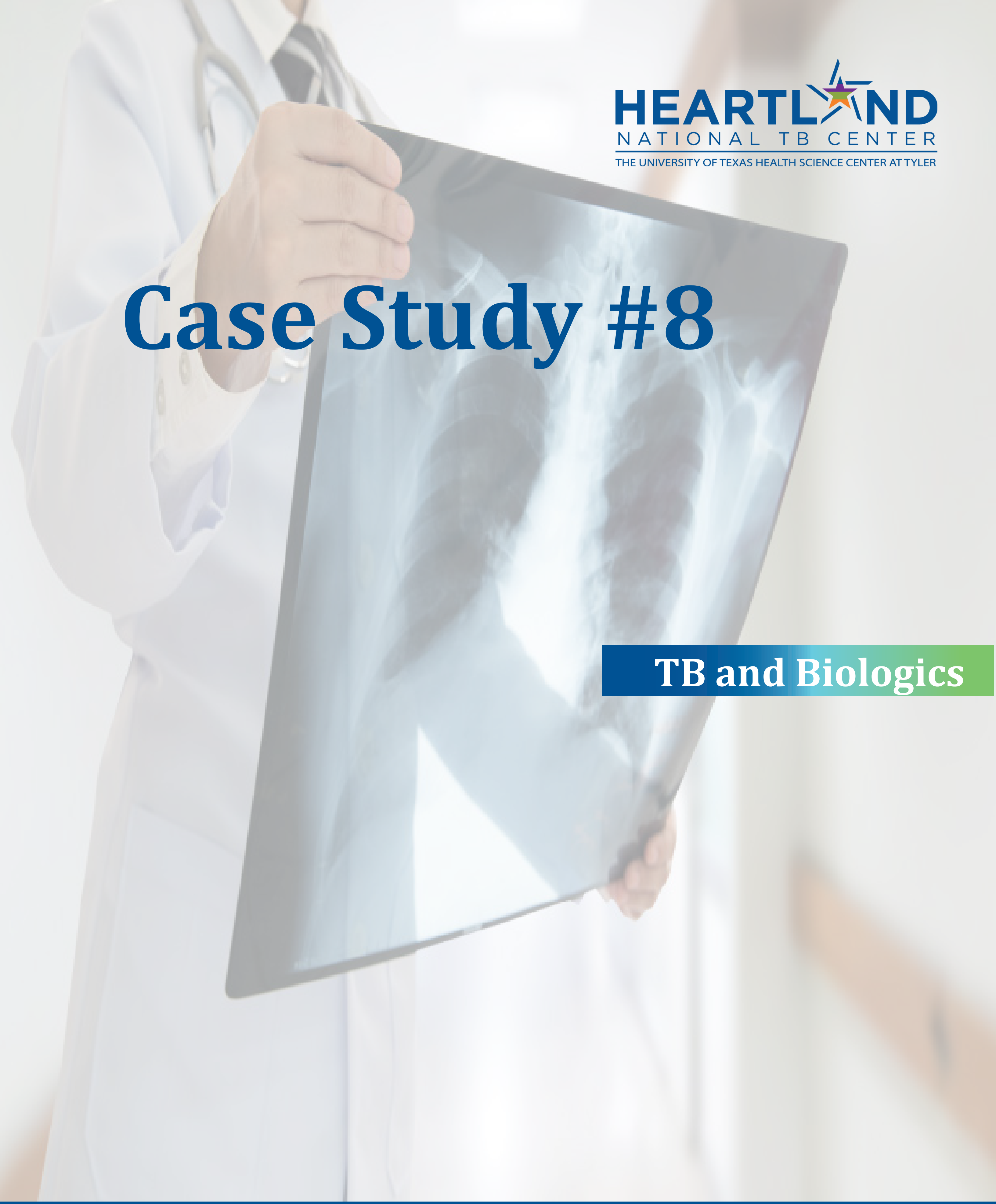

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Case Study #8

TB and Biologics

Case Study 8

TB and Biologics

A 55-year-old caucasian female was recently diagnosed with rheumatoid arthritis and was prescribed Humira® [adalimumab - a biologic agent].

1) Should she receive an evaluation for TB prior to starting this medication?

- A. No, she is not at risk for developing TB disease.
- B. No, if she has TB infection it is probably from an infection many years ago and is no longer a concern.
- C. Yes, she should be screened and evaluated for TB.
- D. Yes, she should undergo two-step TST testing and medical evaluation for TB.

The patient should receive a TB screening prior to starting a biologic, however in this scenario, the patient did not undergo an evaluation. Three months after starting Humira® she experienced generalized weakness, cough, and shortness of breath, which she attributed to the biologic and stopped taking it. Two months later she went to visit family in Virginia where she was hospitalized with complaints of cough, shortness of breath, fatigue, chills, headaches, persistent fever, and a 16 pound weight loss. A TST was placed and interpreted as negative.

2) Can TB be ruled out by the negative TST?

- A. No, the TST may not be reactive due to immunosuppression related to drug treatment and active TB disease.
- B. A TST is not relevant because she has no risk factors for TB.
- C. Yes, since the immune suppressive treatment stopped two months ago, there should be no lingering effect on the TST.
- D. Yes, there is probably some other infectious process going on.

3) What should be the next step?

- A. Restart Biologics treatment; the abrupt stop in treatment probably caused the symptoms.
- B. Admit patient to an AII room and evaluate for active TB disease.
- C. Discharge patient with contact information for the local health department.
- D. Send her back to Texas for TB evaluation.

A CXR and CT scan revealed interstitial infiltrates throughout both lungs primarily affecting the upper lobes. An ultrasound-guided lung biopsy revealed a positive AFB smear and the culture grew *Mycobacterium tuberculosis*. She was placed on INH, RIF, EMB, PZA, and azithromycin and was reported to the local health department in Virginia who assumed TB care. After respiratory isolation precautions were discontinued she returned home to Texas.

4) What are the appropriate actions for the Virginia local health department nurse to take regarding transfer of care?

A. Immediately make direct contact with the patient's close contacts in Texas.
B. Contact the Texas Department of State Health Services to report the case.
C. Maintain patient confidentiality and do not let anyone know this patient has TB.
D. Ask the patient's permission to contact the Texas Department of State Health Services.

The nurse completed the Interjurisdictional Follow-up Form (see Appendix H) with treatment details and sent it to the Texas Department of State Health Services, TB Control Program for transfer of TB care. After returning home, the patient successfully completed 6 months of TB treatment under DOT. Humira® was restarted by the rheumatologist after completion of treatment as recommended by the American College of Rheumatology Guidelines.

Reflection

In this scenario, the prescribing physician did not follow the ACR RA treatment guidelines which recommend that patients be screened and treated (if indicated) for tuberculosis prior to starting treatment for rheumatoid arthritis. The guidelines further suggest biologics should be started/restarted after completion of TB treatment (see Appendix I), however for special situations seek expert medical consultation by a TB expert (see Appendix E).

The patient in this scenario was diagnosed in Virginia but returned home to Texas to continue her treatment warranting the need for an Interjurisdictional transfer. Any patient whose care is being transferred from one state or program to another requires that an Interjurisdictional TB Notification (IJN) Form be competed and submitted to the receiving health department.

For more information on interjurisdictional transfers see http://www.tbcontrollers.org/resources/interjurisdictional-transfers/.

Answer

1) **Should she receive an evaluation for TB before starting these medications?**

Answer: C. Yes, she should be screened and evaluated for TB.

Rationale: According to 2015 American College of Rheumatology Guidelines, screening for TB in the context of biologics should be done because persons who are receiving immunosuppressive therapy such as tumor necrosis factor-alpha (TNF) antagonists are at increased risk for progression to active TB disease if they have been infected with TB.[1]4

2) **Can TB be ruled out by the negative TST?**

Answer: A. No, the TST may not be reactive due to immunosuppression related to drug treatment and active TB disease.

Rationale: The negative TST should not exclude the possibility of TB. Some medications are known to weaken the immune system causing a false negative TST reaction. Additionally, patients with overwhelming active TB disease may have a negative TST.[2]

3) **What should be the next step?**

Answer: B. Admit patient to an AII room and evaluate for active TB disease.

Rationale: The patient is having signs and symptoms of TB and should be placed in isolation until she is no longer infectious and evaluated for TB disease with a CXR and sputum specimen collection.[4]

4) **What are the appropriate actions for the nurse to take with this case?**

Answer: B. Contact the Texas Department of State Health Services to report the case.

Rationale: Interstate communication is essential to coordinate TB treatment and the investigation surrounding this patient diagnosed with TB disease. An interjurisdictional form (see Appendix H) should be completed for transfer of care.[6]

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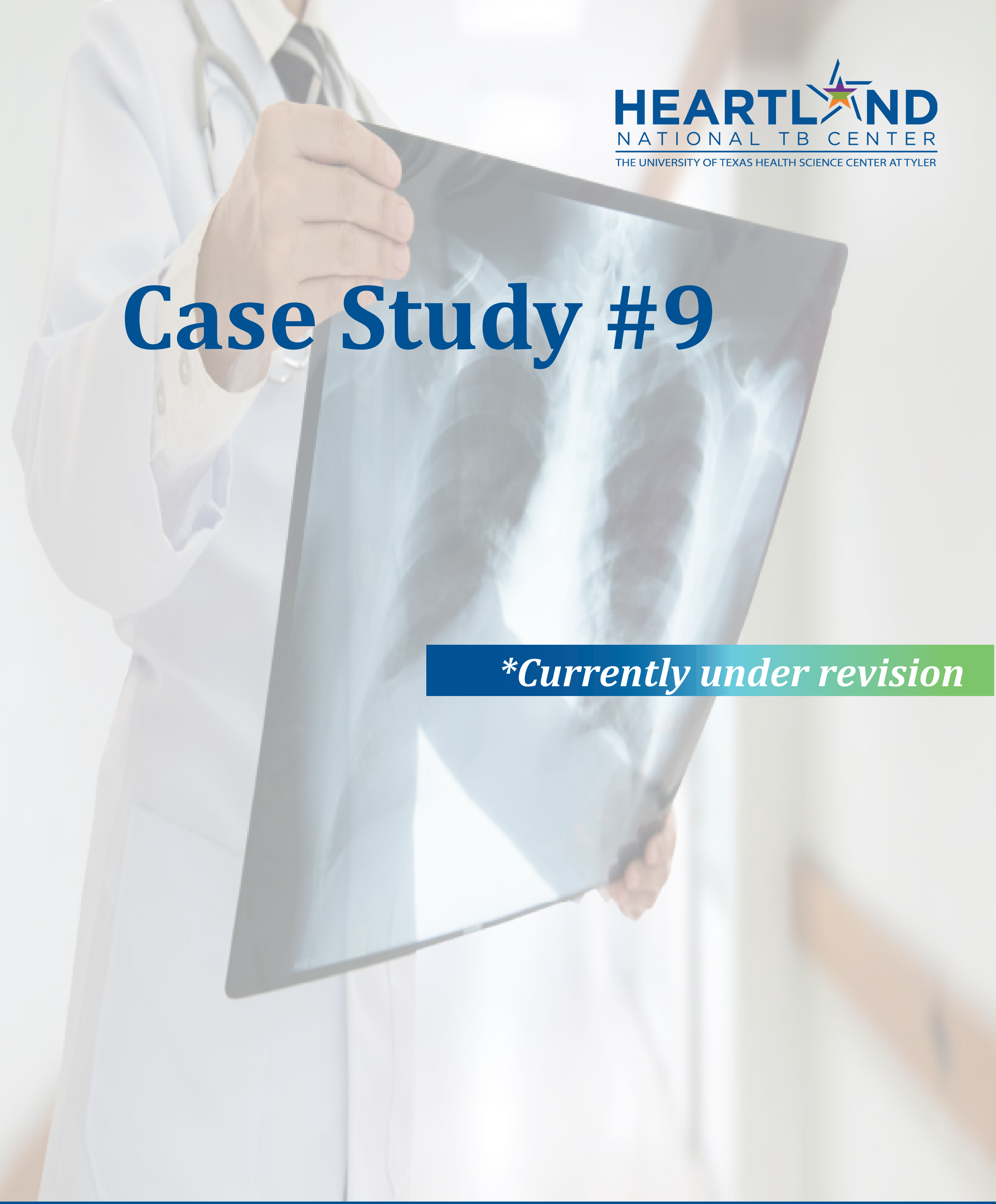

Case Study #9

**Currently under revision*

Case Study 9

Currently under revision

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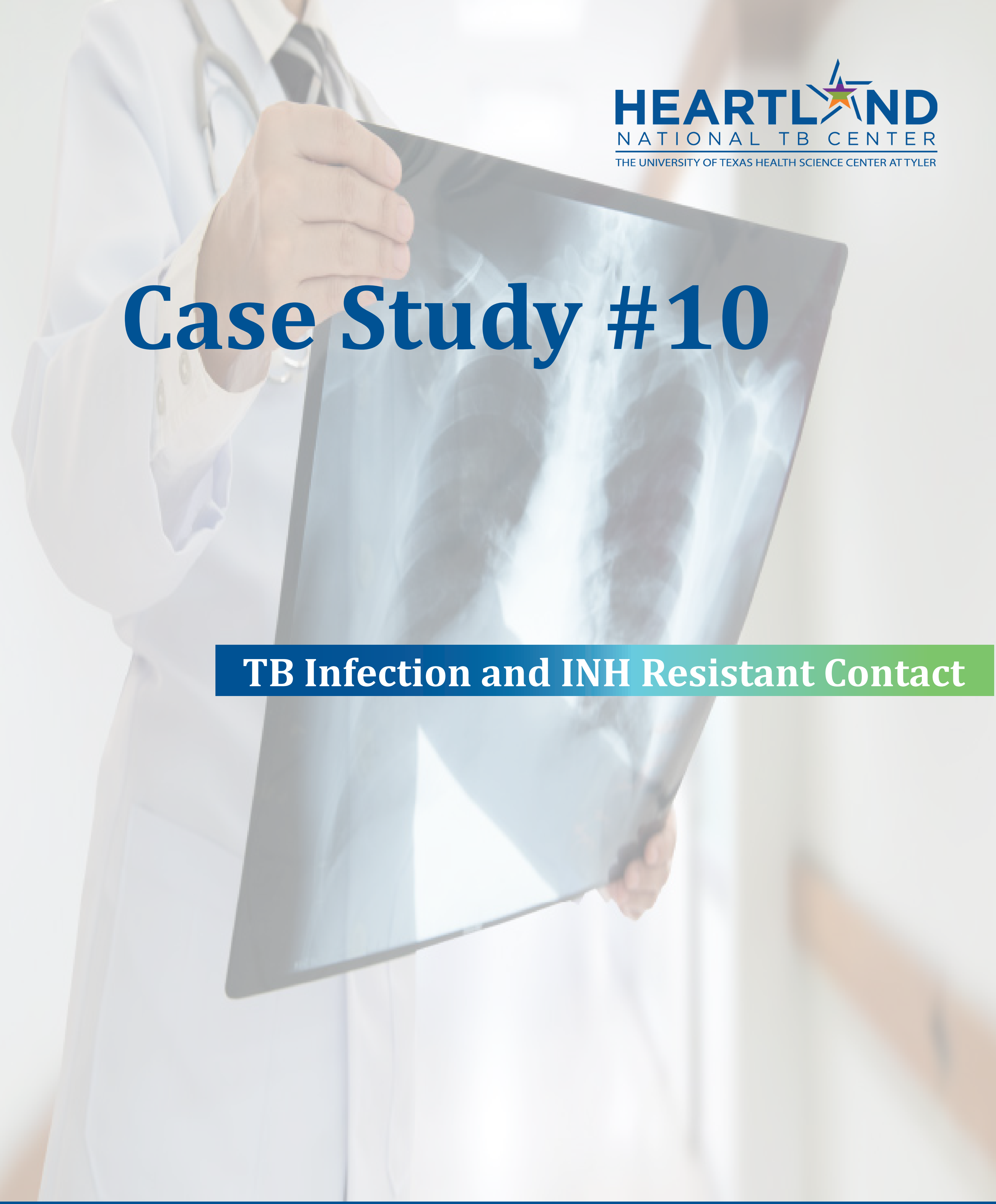
(Page 59)



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Case Study #10

TB Infection and INH Resistant Contact

Case Study 10

TB Infection and INH Resistant Contact

A 55 year old Vietnamese male contacts the local health department to schedule an appointment because he was identified as a close contact to a person with active TB disease. The nurse confirms that his brother who lives in the home with him was recently diagnosed with active TB disease and schedules an appointment for him. He tells the nurse he understands some English, but prefers to speak Vietnamese.

1) Which of these actions should the local health department nurse take?

A. Find a qualified interpreter to facilitate the clinician-patient interaction.
B. Ask the patient to bring a family member to the appointment to translate.
C. Ask him to use an app for translation during the interview.
D. Do not consider the language barrier and continue speaking slowly.

The nurse employed the services of Language Line® the interpreting service used by the clinic to conduct the screening. The clinic visit included the placement of a TST and a symptom screening. During the visit, he reported having a TST 4 months ago as part of a job-readiness screening which was negative and did not indicate having signs or symptoms of TB. The patient returned to the clinic two days later as instructed for his TST results which was interpreted as 9mm indurated.

2) How is this TST result interpreted?

A. This is a false positive reaction due to prior BCG vaccine.
B. The TST is positive because the cutoff point for recent contacts is 5 mm induration.
C. Interpret the TST as negative because it is less than 10 mm induration which is the cutoff point for foreign-born individuals.
D. The TST result is unreliable for this patient and should be confirmed with an IGRA test.

Upon classification of a positive TST reaction, the patient is referred for a CXR and a clinical assessment to rule out TB disease. His medical history includes hypertension and history of BCG vaccine at birth, but is otherwise unremarkable. The patients CXR results were normal. His social history revealed that the he is currently living alone, is a recovering alcoholic, and denies all other substance use. He seems quiet and withdrawn and has a disheveled appearance.

3) Which of these actions should the local health department nurse take?

A. Nothing, he probably won’t take treatment anyway.
B. Start him on treatment for TB infection.
C. Wait for susceptibilities from the source case.
D. Collect sputum specimens for AFB.

The local health department nurse provided TB education materials in his primary language and explained the difference between TB infection and TB disease. He was started on treatment with INH for nine months. 2 weeks after starting treatment the local health department received susceptibility results for the source case indicating that he has INH resistant TB.

4) What should the next course of action be?

A. Explain to the patient that he may be infected with a drug resistant strain of TB.
B. Consult an expert with experience in treating patients exposed to INH resistant TB.
C. Place the patient in respiratory isolation.
D. A and B.

The nurse consulted with a TB expert for treatment options, and the patient was instructed to stop taking the INH, and return to the clinic with the bottle of untaken medications.

5) Which treatment for TB infection would molst likely be recommended for a close contact to a patient with INH resistant TB?

A. RIF for four months
B. INH for nine months
C. RIPE
D. 3HP

At the clinic the patient was reeducated to include drug resistant TB, discuss the new treatment plan, and potential side effects and adverse reactions. The patient was started on RIF daily for four months.

6) What are some potential side effects of RIF?

A. Rash
B. orange discoloration of urine
C. Gastrointestinal symptoms
D. All of the above

Reflection

In this scenario, an interpreter was used to facilitate the patient visit. When providing care for individuals whose primary language is different from the provider, it is important to secure interpretation services so that the patient is aware of all medical procedures and questions can be addressed appropriately in order to reduce the potential for medical errors and increase the quality of care.

The patient was started on treatment for TB infection with INH for nine months because he was a recent contact to a case and drug resistance was not suspected. If there is concern that the source case may have drug resistance, treatment for TB Infection should be delayed until susceptibilities for the source case are received. Given that the patient was starting a new treatment regimen, it is important that he is re-educated in his primary language on potential side effects and adverse reactions to the new regimen.

Answers

1) **Which of these actions should the local health department nurse take?**
   Answer: A. Find a qualified interpreter to facilitate the clinician-patient interaction.
   Rationale: In order to communicate effectively, the local health department should use interpreters who are fluent in the patient's primary language during clinician/patient interaction.[1]6

2) **How is this TST result interpreted?**
   Answer: B. The TST is positive because the cutoff point for recent contacts is 5 mm induration.
   Rationale: The TST interpretation depends on risk factors (close/recent contact to source case) for progression to TB disease.[4]

3) **Which of these actions should the local health department nurse take?**
   Answer: B. Start him on treatment for TB infection.
   Rationale: Individuals who are recent contacts of persons diagnosed with infectious TB disease should be given high priority for treatment of TB infection.[11]

4) **What should the next course of action be?**
   Answer: D. A and B
   Rationale: Consultation with a TB expert is recommended for selecting or modifying a regimen to treat contacts of patients with drug resistant pulmonary TB.[6]

5) **Which treatment for TB infection would molst likely be recommended for a close contact to a patient with INH resistant TB?**
   Answer: A. RIF for four months.
   Rationale: Patients who have been exposed to INH resistant TB should be treated with RIF for four months.[6]

6) **What are some potential side effects of RIF?**
   Answer: D. All of the above
   Rationale: Rash, orange discoloration of urine, gastrointestinal symptom, hypersensitivity are some potential side effects of RIF. [11]

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4. Centers for Disease Control and Prevention. (2013). *Core curriculum on Tuberculosis: What the clinician should know, 5th ed*. Atlanta, GA: US Department of Health and Human Services, CDC.

6. Centers for Disease Control and Prevention. *Guidelines for the Investigation of Contacts of Persons with Infectious Tuberculosis: Recommendations from the National Tuberculosis Controllers Association and CDC*, United States. MMWR 2005a; 54 (No. RR-15).

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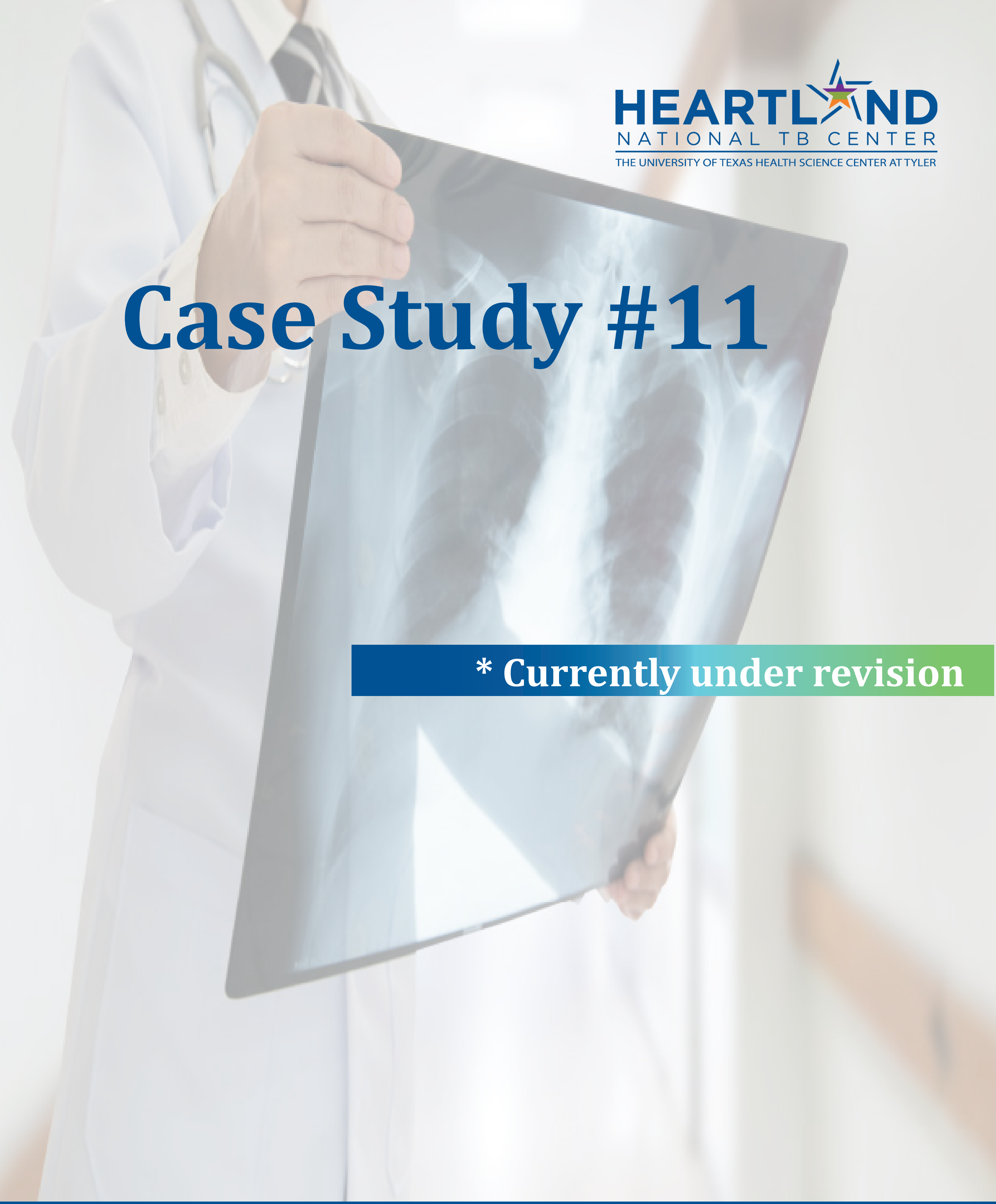

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Case Study #11

* Currently under revision

Case Study 11

Currently under revision

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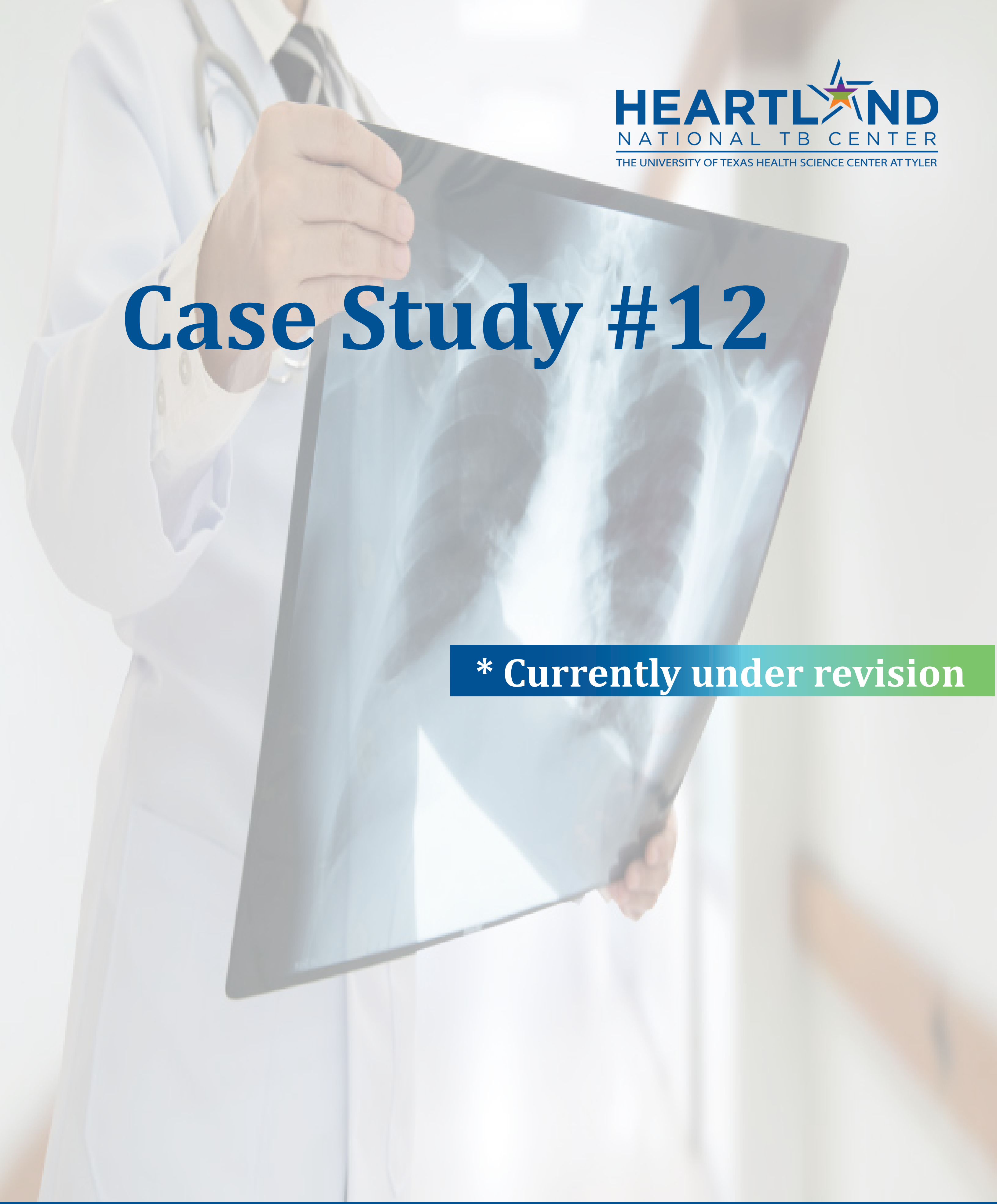

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* Currently under revision

Case Study 12

Currently under revision

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Appendices

Appendix A.
Smear Classification Results

Smear Classification Results

Smear Result (Number of AFB observed at 1000X magnification)	Smear Interpretation	Infectiousness of Patient
4+ (>9/field)	Strongly positive	Probably very infectious
3+ (1-9/field)	Strongly positive	Probably very infectious
2+ (1-9/10 fields)	Moderately positive	Probably infectious
1+ (1-9/100 fields)	Moderately positive	Probably infectious
+/- (1-2/300 fields)*	Weakly positive†	Probably infectious
No acid-fast bacilli seen	Negative	Probably not infectious**

* There are variations on labeling for this result, and include listing the number of AFB counted.

† Laboratories may report these smear results as "doubtful" or "inconclusive" based on CDC guidelines.

** The criteria for determining whether a patient may be considered noninfectious are discussed in Chapter 7 on TB Infection Control.

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4. Centers for Disease Control and Prevention. (2013). *Core curriculum on Tuberculosis: What the clinician should know, 5th ed.* Atlanta, GA: US Department of Health and Human Services, CDC.

Appendix B.

Criteria for Patients to be Considered Noninfectious

Criteria for Patients to Be Considered Noninfectious

Criteria
Patients can be considered noninfectious when they meet all of the following three criteria: 1. They have three consecutive negative AFB sputum smears collected in 8- to 24-hour intervals (at least one being an early morning specimen); 2. Their symptoms have improved clinically (for example, they are coughing less and they **no longer** have a fever); **and** 3. They are compliant with an adequate treatment regimen for 2 weeks or longer.

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4. Centers for Disease Control and Prevention. (2013). *Core curriculum on Tuberculosis: What the clinician should know, 5th ed.* Atlanta, GA: US Department of Health and Human Services, CDC.

Appendix C.

Guidance on Release from Hospital Tuberculosis Isolation[a]

Diagnositcs:	Clinical Impression:	Under Airborne Isolation (AII) and discharging to:	Patient must meet all criteria:
Sputum **AFB Smear Positive *AND* NAAT Positive**	Active TB Disease	**Home—No** high risk individuals or individuals without prior exposure	• Follow-up plan has been made with local TB program and DOT has been arranged[b] • Started on standard TB treatment • All household members, who are not immunocompromised, have been previously exposed to the person with TB • Patient is willing to not travel outside the home until negative sputum smear results are received • No infants or children younger than 5 years of age or persons with immunocompromising conditions are present in the household who have not been evaluated and started on appropriate treatment
		Home—WITH high risk individuals OR **High-Risk/Congregate Setting**	Patients with infectious TB should NOT be allowed to return to a setting with high risk individuals. The patient can be *discharged* and is considered non-infectious if: • Three consecutive negative sputum smears from sputum collected in 8 - 24 hour intervals (at least one early morning specimen) ***AND*** • Started on drug regimen and tolerating for AT LEAST 2 weeks or longer ***AND*** • Symptoms have improved
Sputum **AFB Smear Negative** (or No Sputum AFB Smear Done) ***AND*** **NAAT Positive**	High likelihood of TB	**Home**—with/without high risk individuals OR **High-Risk/Congregate Setting**	• Three consecutive negative sputum smears from sputum collected in 8 to 24 hour intervals (at least one early morning specimen) • Started on standard TB treatment and tolerating for AT LEAST 5 days • A plan has been made to follow-up on culture results • No infants or children younger than 5 years of age or persons with immunocompromising conditions are present in the household who have not been evaluated and started on appropriate treatment
Sputum **AFB Smear Negative *AND* NAAT Negative**	High likelihood of TB	**Home**—with/without high risk individuals OR **High-Risk/Congregate Setting**	

***AFB** - Acid-fast bacilli* ***AII** - airborne infection isolation* ***DOT** - Directly Observed Therapy* ***DST** - Drug Susceptibility Testing*
***MDDR** - Molecular Detection of Drug Resistance* ***MDR** - Multi-drug resistant* ***NAAT** - Nucleic Acid Amplification Test*
***TB** - Tuberculosis* ***XDR** - Extensively-drug resistant*

[a] Pulmonary Tuberculosis

[b] The hospital and/or treating clinician should contact the local health department prior to release of a patient with confirmed active TB disease.

Appendix C.
Guidance on Release from Hospital Tuberculosis Isolation[a]

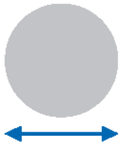
Diagnostics:	Clinical Impression:	Under Airborne Isolation (AII) and discharging to:	Patient must meet all criteria:
Sputum **AFB Smear Negative *AND* NAAT Negative**	TB is unlikely	**Home**—with/without high risk individuals OR **High-Risk/Congregate Setting**	• Three consecutive negative sputum smears from sputum collected in 8 to 24 hour intervals (at least one early morning specimen) • A plan has been made to follow-up on culture results • A diagnosis other than TB is identified or is likely
Sputum **AFB Smear Positive *AND* NAAT Negative** **A second NAAT should be considered to confirm**	High likelihood of TB	**Home**—with/without high risk individuals OR **High-Risk/Congregate Setting**	• Three consecutive negative sputum smears from sputum collected in 8 to 24 hour intervals (at least one early morning specimen) • Started on standard TB treatment and tolerating for AT LEAST 5 days • A plan has been made to follow-up on culture results • No infants or children younger than 5 years of age or persons with immunocompromising conditions are present in the household who have not been evaluated and started on appropriate treatment
	TB is unlikely		• Three consecutive negative sputum smears from sputum collected in 8 to 24 hour intervals (at least one early morning specimen) • A plan has been made to follow-up on culture results • A diagnosis other than TB is identified or is likely
Confirmed or **Strongly Suspected** MDR or XDR Diagnosed via: DST, MDDR, GeneXpert, or MTB/RIF Assay	N/A	**Home**—with/without high risk individuals OR **High-Risk/Congregate Setting**	• Three consecutive negative sputum smears from sputum collected in 8 to 24 hour intervals (at least one early morning specimen) ***AND*** • Started on adequate DR-TB drug regimen and tolerating for AT LEAST 2 weeks (14 daily doses) or longer ***AND*** • At least 2 consecutive negative sputum cultures without a subsequent positive culture

References

1. *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings.* Centers for Disease Control and Prevention. MMWR: December 30, 2005; Volume 54 (RR17).
2. *Controlling Tuberculosis in the United States.* Centers for Disease Control and Prevention. MMWR: November 4, 2005; Volume 54 (RR12s).

Appendix D.
Interpreting the TST Reaction

Interpreting the TST Reaction

		
5 or more millimeters	**10 or more millimeters**	**15 or more millimeters**
An induration of **5 or more millimeters** is considered positive for • HIV-infected persons • Recent contacts of persons with infectious TB • People who have fibrotic changes on a chest radiograph • Patients with organ transplants and other immunosuppressed patients (including patients taking a prolonged course of oral or intravenous corticosteroids or TNF-*α* antagonists)	An induration of **10 or more millimeters** is considered positive for • People who have come to the United States within the last 5 years from areas of the world where TB is common (for example, Asia, Africa, Eastern Europe, Russia, or Latin America) • Injection drug users • Mycobacteriology lab workers • People who live or work in high-risk congregate settings • People with certain medical conditions that place them at high risk for TB (silicosis, diabetes mellitus, severe kidney disease, certain types of cancer, and certain intestinal conditions) • Children younger than 5 years of age • Infants, children, and adolescents exposed to adults in high-risk categories	An induration of **15 or more millimeters** is considered positive for • People with no known risk factors for TB

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4. Centers for Disease Control and Prevention. (2013). *Core curriculum on Tuberculosis: What the clinician should know, 5th ed.* Atlanta, GA: US Department of Health and Human Services, CDC.

Appendix E.
Expert Resources for Tuberculosis Consultation and Training

Centers of Excellence

(formerly known as Regional Training and Medical Consultation Centers)

Curry International Tuberculosis Center (CITC)

Service area: Arizona, Alaska, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Wyoming, Nevada, Oregon, Utah, Washington, U.S. Affliated Pacific Islands
University of California, San Francisco
300 Frank H. Ogawa Plaza, Suite 520, Oakland, California 94612-2037
Telephone: 510-238-5100
TB Medical Consultation: 877-390-6682 (toll-free)
Website: http://www.currytbcenter.ucsf.edu/
Email: CurryTBCenter@ucsf.edu

Heartland National TB Center (HNTC)

Service area: Arkansas, Iowa, Kansas, Louisiana, Missouri, Nebraska, Oklahoma, South Dakota, Texas
The University of Texas Health Science Center at Tyler
Texas Center for Infectious Disease
2303 Southeast Military Drive, Building 501, San Antonio, Texas 78223
Telephone/TB Medical Consultation: 800-TEX-LUNG (toll-free)
Website: http://www.heartlandntbc.org/
Email: Iris.Barrera@uthct.edu; Catalina. Navarro@uthct.edu

New Jersey Medical School Global Tuberculosis Institute (GTBI)

Service area: Connecticut, District of Columbia, Delaware, Maine, Maryland, Massachusettes, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Michigan, Ohio, Indiana, Virginia, West Virginia, U.S. Affliated Pacific Islands
Rutgers, The State University of New Jersey
225 Warren Street, 2nd Floor, East Wing, Newark, New Jersey, 07103
Telephone: 973-972-3270
TB Medical Consultation: 800-4TB-DOCS (toll-free)
Website: http://globaltb.njms.rutgers.edu/
Email: globaltbinstitute@njms.rutgers.edu

Appendix E.
Expert Resources for Tuberculosis Consultation and Training (continued)

Southeastern National Tuberculosis Center (SNTC)

Service area: Alabama, Florida, Georgia, Illinois, Kentucky, Michigan, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia, Wisconsin, West Virginia, U.S. Affliated Pacific Islands
University of Florida, Gainesville
2055 Mowry Road
Gainesville, Florida 32611
Telephone: 352-273-SNTC; 888-265-SNTC (toll-free)
TB Medical Consultation: 800-4TB-INFO (toll-free)
Website: https://sntc.medicine.ufl.edu
Email: sntc@medicine.ufl.edu

Centers for Disease Control and Prevention, National Center for HIV/AIDS, Viral Hepatitis, Sexually Transmitted Diseases (STD), and TB Prevention, Division of Tuberculosis Elimination (DTBE)

CDC/DTBE provides programmatic consultation to local and state health departments including onsite assistance for outbreaks and medical consultation for management of individual patients, as well as provides information of current guidelines and their intrepretation.

Centers for Disease Control and Prevention, DTBE
1600 Clifton Road, Northeast, Mailstop E-10
Atlanta, Georgia 30333
Telephone: 800-CDC-INFO (toll-free)
Website: http://www.cdc.gov/tb/
Email: cdcinfo@cdc.gov

Appendix F.

Appendix removed

Appendix G.

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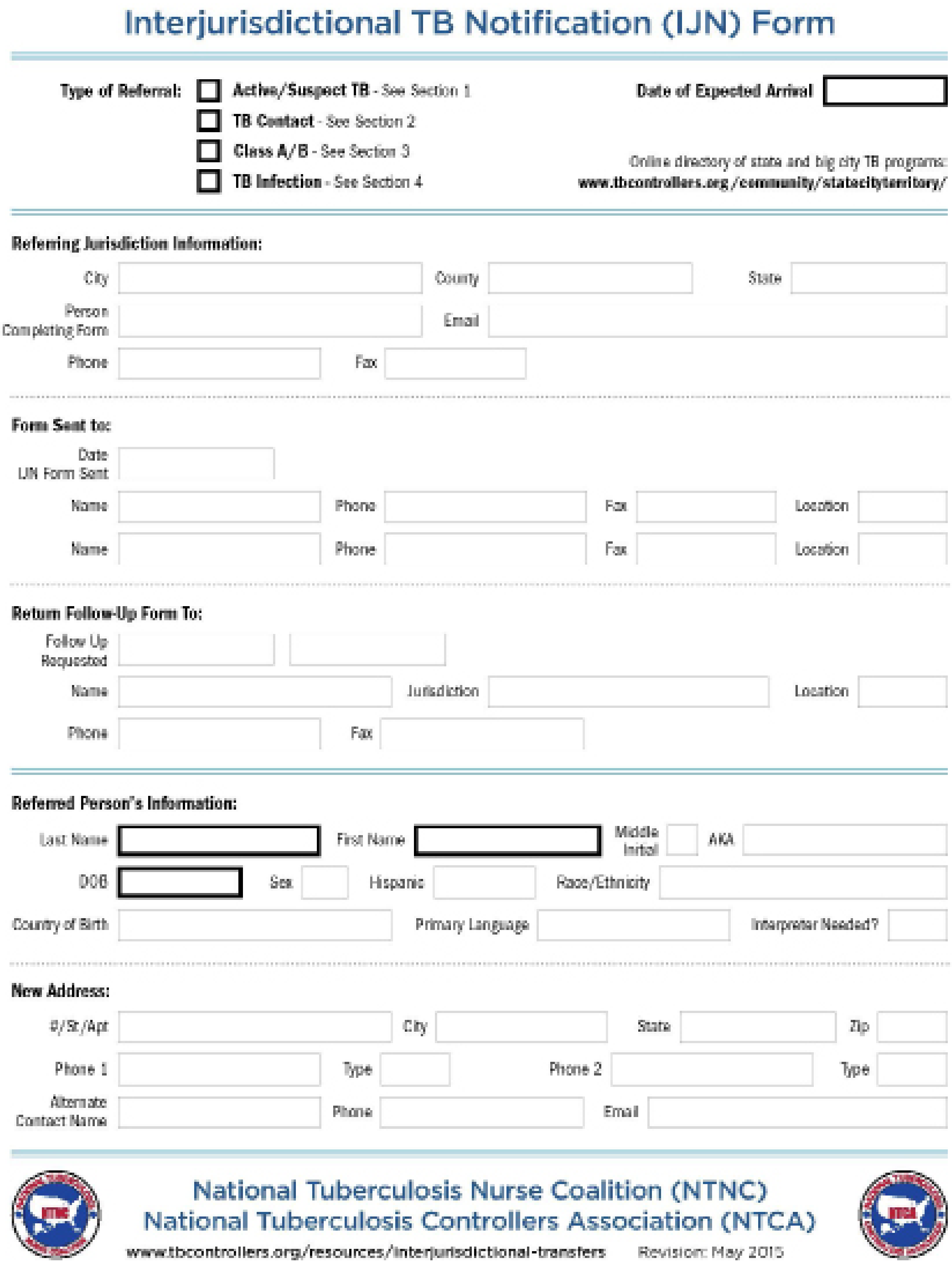
Appendix H.
Interjurisdictional TB Notification (IJN) Form



Interjurisdictional TB Notification (IJN) Form

Type of Referral:
☐ **Active/Suspect TB** - See Section 1
☐ **TB Contact** - See Section 2
☐ **Class A/B** - See Section 3
☐ **TB Infection** - See Section 4

Date of Expected Arrival ☐

Online directory of state and big city TB programs:
www.tbcontrollers.org/community/statecityterritory/

Referring Jurisdiction Information:

City | County | State
Person Completing Form | Email
Phone | Fax

Form Sent to:

Date IJN Form Sent
Name | Phone | Fax | Location
Name | Phone | Fax | Location

Return Follow-Up Form To:

Follow Up Requested
Name | Jurisdiction | Location
Phone | Fax

Referred Person's Information:

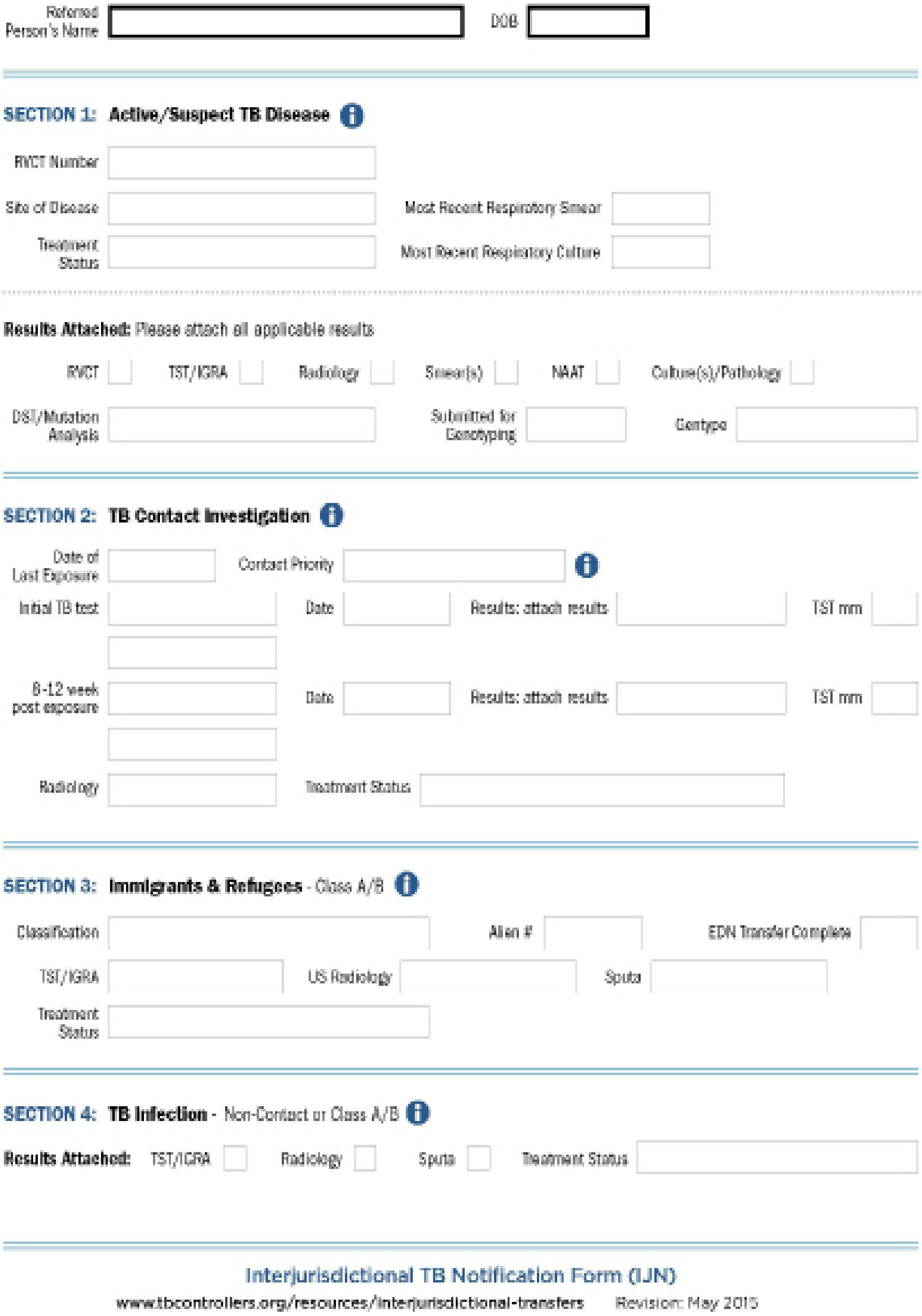
Last Name | First Name | Middle Initial | AKA
DOB | Sex | Hispanic | Race/Ethnicity
Country of Birth | Primary Language | Interpreter Needed?

New Address:

#/St./Apt | City | State | Zip
Phone 1 | Type | Phone 2 | Type
Alternate Contact Name | Phone | Email

National Tuberculosis Nurse Coalition (NTNC)
National Tuberculosis Controllers Association (NTCA)
www.tbcontrollers.org/resources/interjurisdictional-transfers Revision: May 2015

Appendix H.
Interjurisdictional TB Notification (IJN) Form (continued)



Referred Person's Name

DOB

SECTION 1: Active/Suspect TB Disease

RVCT Number

Site of Disease

Most Recent Respiratory Smear

Treatment Status

Most Recent Respiratory Culture

Results Attached: Please attach all applicable results

RVCT ☐ TST/IGRA ☐ Radiology ☐ Smear(s) ☐ NAAT ☐ Culture(s)/Pathology ☐

DST/Mutation Analysis

Submitted for Genotyping

Gentype

SECTION 2: TB Contact Investigation

Date of Last Exposure

Contact Priority

Initial TB test

Date

Results: attach results

TST mm

8-12 week post exposure

Date

Results: attach results

TST mm

Radiology

Treatment Status

SECTION 3: Immigrants & Refugees - Class A/B

Classification

Alien #

EDN Transfer Complete

TST/IGRA

US Radiology

Sputa

Treatment Status

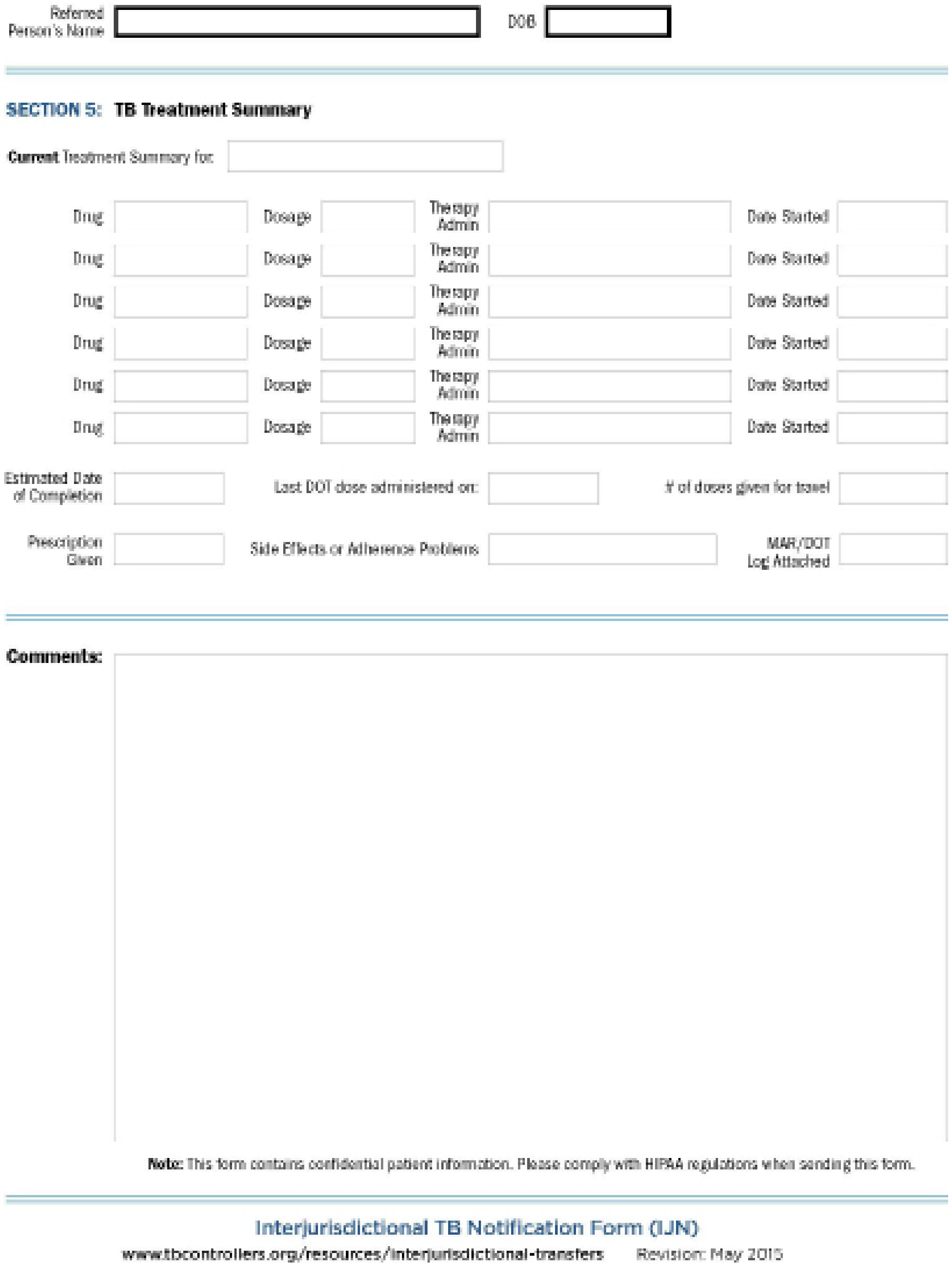
SECTION 4: TB Infection - Non-Contact or Class A/B

Results Attached: TST/IGRA ☐ Radiology ☐ Sputa ☐ Treatment Status

Interjurisdictional TB Notification Form (IJN)

www.tbcontrollers.org/resources/interjurisdictional-transfers Revision: May 2015

Appendix H.
Interjurisdictional TB Notification (IJN) Form (continued)



Referred Person's Name ☐ DOB ☐

SECTION 5: TB Treatment Summary

Current Treatment Summary for: ☐

Drug		Dosage		Therapy Admin		Date Started	
Drug		Dosage		Therapy Admin		Date Started	
Drug		Dosage		Therapy Admin		Date Started	
Drug		Dosage		Therapy Admin		Date Started	
Drug		Dosage		Therapy Admin		Date Started	
Drug		Dosage		Therapy Admin		Date Started	

Estimated Date of Completion ☐ Last DOT dose administered on: ☐ # of doses given for travel ☐

Prescription Given ☐ Side Effects or Adherence Problems ☐ MAR/DOT Log Attached ☐

Comments: ☐

Note: This form contains confidential patient information. Please comply with HIPAA regulations when sending this form.

Interjurisdictional TB Notification Form (IJN)

www.tbcontrollers.org/resources/interjurisdictional-transfers Revision: May 2015

Appendix I.
TB Screening Algorithm for Biologics or Tofacitinib

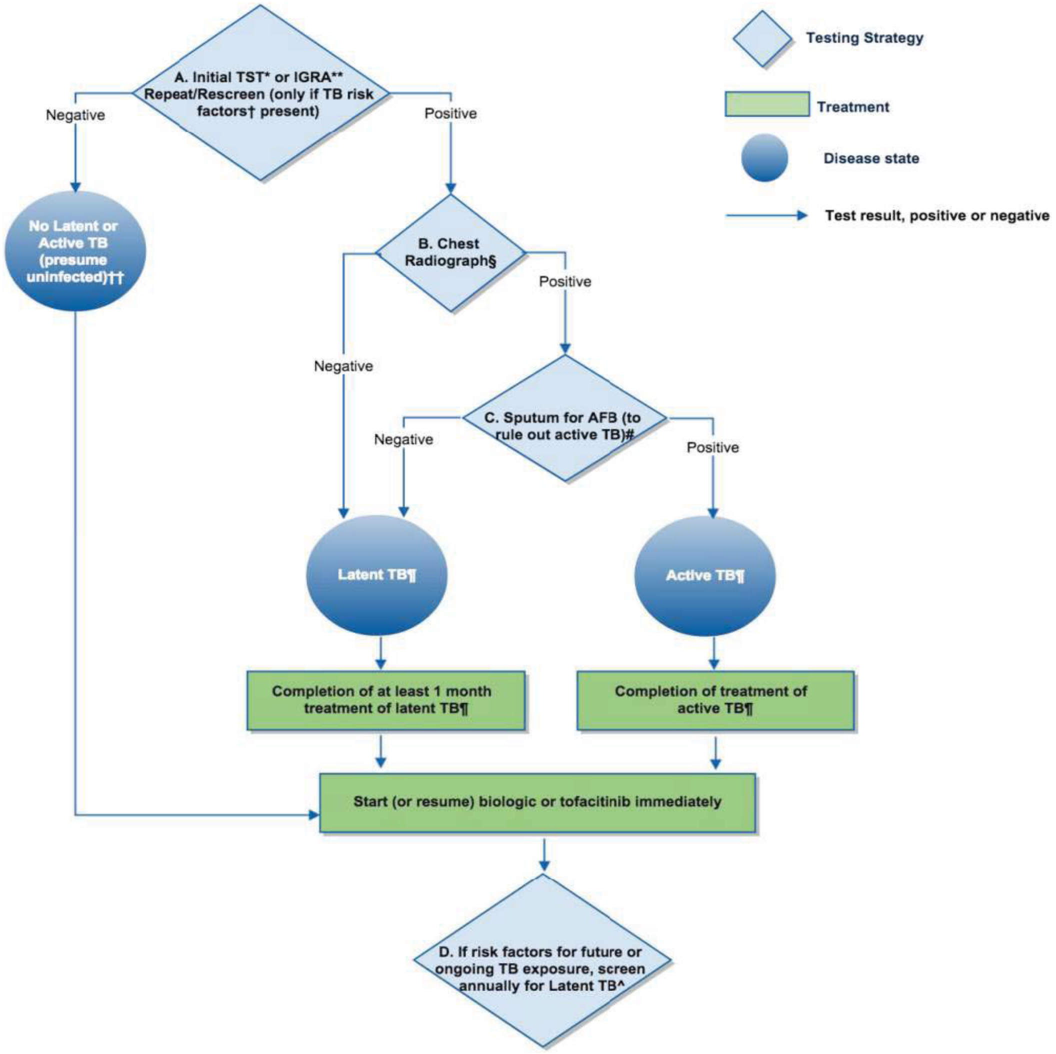


Figure 6. Tuberculosis (TB) screening algorithm for biologics or tofacitinib (endorsed and modified from the 2012 American College of Rheumatology RA treatment recommendations). The Voting Panel reviewed and endorsed the 2012 TB screening algorithm with 1 change, that tofacitinib should be included alongside biologics. * – anergy panel testing is not recommended. ** – interferon-gamma release assay (IGRA) is preferred if patient has a history of BCG vaccination. † – risk factors for TB exposure are defined based on a publication from the US Centers for Disease Control and Prevention as: close contacts of persons known or suspected to have active TB, foreign-born persons from areas that have a high incidence of active TB (e.g., Africa, Asia, Eastern Europe, Latin America, and Russia), persons who visit areas with a high prevalence of active TB, especially if visits are frequent or prolonged, residents and employees of congregate settings whose clients are at increased risk for active TB (e.g., correctional facilities, long-term care facilities, and homeless shelters), health care workers who serve clients who are at increased risk for active TB, populations defined locally as having an increased incidence of latent *Mycobacterium tuberculosis* infection or active TB, possibly including medically underserved, low-income populations, or persons who abuse drugs or alcohol, and infants, children, and adolescents exposed to adults who are at increased risk for latent *M tuberculosis* infection or active tuberculosis (159,160). †† – if patient is immunosuppressed and false-negative results more likely, consider repeating screening test(s) with tuberculin skin test (TST) or IGRA. § – chest radiography may also be considered when clinically indicated in patients with risk factors, even with a negative result on repeat TST or IGRA. # – obtain respiratory (e.g., sputum, bronchoalveolar lavage) or other samples as clinically appropriate for acid-fast bacilli (AFB) smear and culture. Consider referral to TB specialist for further evaluation and treatment. ¶ – in a patient diagnosed as having latent or active TB, consider referral to a specialist for the recommended treatment. ^ – patients who test positive for TST or IGRA at baseline (pretreatment) often remain positive for these tests even after successful treatment of TB. These patients need monitoring for clinical signs and symptoms of recurrent TB disease, since repeating tests will not allow help in diagnosis of recurrent TB. The level of evidence supporting each recommendation for TB reactivation was derived from consensus opinion of experts, case studies, or standards of care. The level of evidence for initiation of biologics in patients being treated for latent TB infection was higher, with data derived from a single randomized trial or nonrandomized studies. Adapted from ref. 5.

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Appendix J.
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htm#Box1

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