

Understanding and Preventing Tuberculosis

Med Center Health

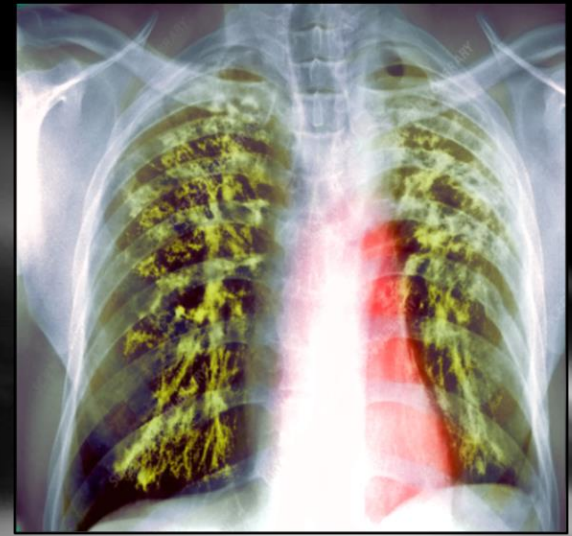


Objectives for this computer based learning course:

- ❖ describe how to prevent the spread of tuberculosis
- ❖ compare latent and active TB
- ❖ outline steps to take if you are exposed to TB
- ❖ describe OSHA regulations and the respiratory protection program
- ❖ describe tuberculosis diagnosis and treatment



Understanding and Preventing Tuberculosis



- ❖ **Tuberculosis (TB)** is a disease caused by the germ **Mycobacterium tuberculosis** or (MTB).
- ❖ Growth of the TB germ in the lungs causes tissue destruction.

TB usually affects the lungs, but it can also affect other parts of the body, such as:

- ❖ the brain
- ❖ the kidneys
- ❖ the spine
- ❖ the lymph nodes



Who has Tuberculosis?




Estimates show that one-fourth of the world's population is infected with the TB germ. About 5-10% of people infected with TB will eventually get symptoms and develop TB disease.

- Each year approximately 10 million cases of **TB** are diagnosed.
- About 1.6 million people died from TB in 2021, making it the 13th leading cause of death and the 2nd leading infectious killer after COVID-19 (above HIV and AIDS).
- In 2022, there were 8,300 cases of **active** TB disease reported in the United States (a rate of 2.5 cases per 100,000 persons).
- There were 70 cases of TB in KY in 2022 with an incidence of 1.6 cases per 100,000 persons.
- Multidrug-resistant TB remains a threat and drug-resistant TB has become an emerging threat. Only about 1 in 3 people with drug resistant TB accessed treatment in 2021.
- TB is curable and preventable. Ending the TB epidemic by 2030 is among the health targets of the United Nations Sustainable Development Goals (SDGs).



QUESTION

Tuberculosis may affect which of the following?

-  toes and fingers
-  liver
-  lungs, brain, kidneys, spine, or lymph nodes

Click on the  next to the correct answer





How Does TB Spread?

- ❖ **TB** spreads from person to person through the air.
- ❖ You can get TB by sharing the air space with an individual with **active** TB who is:
 - ❖ coughing
 - ❖ sneezing
 - ❖ singing
 - ❖ talking
 - ❖ or **anytime** air is forcibly expelled from the lungs

People can become infected when they breathe in air containing TB germs.



What Happens When A Person is Exposed to TB?

- ❖ A person may develop **active** TB disease shortly after exposure to the TB germ.
- ❖ TB can remain **latent or inactive** while the immune system is strong.
- ❖ **Latent** TB may become **active** TB if the immune system is weakened.
- ❖ A person exposed to TB may **never** get the active disease.
- ❖ A person who is exposed to TB has only a 5% to 10% chance of getting the active disease in his/her lifetime. Persons with HIV have a higher risk and TB is currently the leading killer of people who are HIV infected.



Who Is At Risk?

Certain groups of people are more likely to develop tuberculosis.

These groups include:

- ❖ the elderly
- ❖ people born in areas of the world where TB is more common (e.g. Asia, Africa, the Caribbean, and Latin America)
- ❖ alcoholics
- ❖ the homeless
- ❖ IVDU (intravenous drug user)
- ❖ those in institutions
- ❖ people with chronic diseases
- ❖ those with weakened immune systems



Who Is At Risk?

People with certain medical conditions, including:

- ❖ HIV
- ❖ Cancer
- ❖ Diabetes

are more likely to develop **active** TB disease.

People with HIV are **400** times more likely to develop **active** TB disease.



QUESTION

TB is spread from person to person through the air when an individual with **active** TB is coughing, singing, sneezing, and talking.

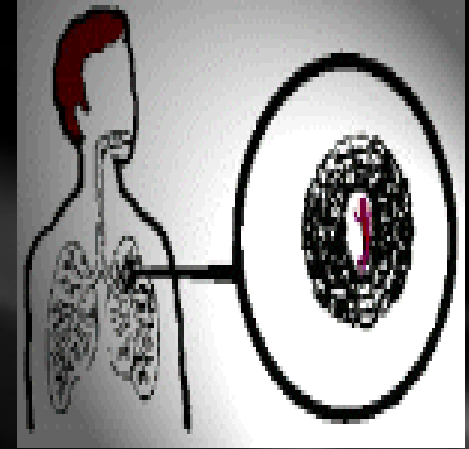
 True

 False

Click on the  next to the correct answer



Latent Tuberculosis



People with **latent** TB infection have the germ that **causes** TB in their bodies.

Persons with **latent** TB:

- ❖ Have **no** signs or symptoms of TB
- ❖ **Cannot** spread the germ to others
- ❖ Have **inactive** TB germs
- ❖ May develop active TB disease at a later time
- ❖ Often receive treatment to prevent getting active disease
- ❖ Will have a positive TB skin test or TB blood test (QuantiFERON-TB Gold, T-Spot)



Active Tuberculosis

People with **active** TB disease have the germ that causes TB in their bodies and have at least one sign or symptom of TB.

- ❖ They are sick from germs that are **active** in their body.
- ❖ They **can** spread the disease to others.
- ❖ They are prescribed drugs that can **usually cure** TB.



Signs and Symptoms of Active TB






Signs and symptoms of **active** TB disease include:

- ❖ Weight loss
- ❖ Fever
- ❖ Night sweats
- ❖ Coughing for more than 3 weeks
- ❖ Chest pain
- ❖ Coughing up blood (hemoptysis)
- ❖ Chills
- ❖ Difficulty breathing
- ❖ Shortness of breath
- ❖ Feeling tired
- ❖ Abnormal chest x-ray
- ❖ Loss of appetite



QUESTION

Which of the following is **NOT** a symptom of **active** TB?

-  night sweats
-  vomiting and diarrhea
-  coughing for more than three weeks
-  feeling tired
-  an abnormal chest x-ray

Click on the  next to the correct answer



Evaluation

Evaluate those suspected of having TB disease in the following ways:

- ❖ Physical examination
- ❖ Mantoux tuberculin skin test (sometimes called a **TST**) or TB blood test
- ❖ Chest x-ray
- ❖ Sputum for AFB smear and culture (need 3 specimen at least 8 hours apart)



Physical Examination

- ❖ A physical exam offers the first opportunity to check for tuberculosis.
- ❖ Note if the patient has **signs and symptoms** of tuberculosis.
- ❖ Is the patient in a group that is **at risk** for TB?
- ❖ Does the patient have a **medical condition** that makes them more likely to develop the **active** TB disease?



Mantoux Tuberculin Skin Test

- ❖ The Mantoux tuberculin skin test (TST) determines if a person is **infected** with the TB germ.
- ❖ It does **NOT** tell you whether a person has **active** TB disease or **latent** TB infection.
- ❖ A small amount of fluid is injected just under the skin into the inner surface of the forearm forming a wheal. If the wheal is inadequate, a new TB skin test will be placed immediately at another site.



Employee skin tests are done annually based on the annual risk assessment of our facilities and state law. Some employees may receive TB skin tests more frequently if clustering of employee TB skin test conversions is noted.



Mantoux Tuberculin Skin Test

- ❖ 48 to 72 hours after injection, a nurse or physician looks for a reaction on the arm. The completed documentation form must be returned to Employee Health. Any employee with a positive skin test must see the Employee Health nurse as soon as possible.
- ❖ A positive reaction is based on a measurement of **swelling or induration** and not on redness. The diameter of the indurated area should be measured perpendicularly to the long axis of the forearm (*not measured along the long axis of the forearm*).
- ❖ A reaction of ten (10) millimeters or more of induration is interpreted as positive and considered highly indicative of tuberculosis infection in a health care setting. (*Remember that infection is not the same as active disease.*)
- ❖ A reaction of five (5) to nine (9) millimeters of induration may be significant in certain individuals with risk factors such as: HIV infection, immunosuppression from disease or medications, fibrotic changes on a chest x-ray consistent with previous TB disease, or recent contact with a person who has active TB disease.
- ❖ Those testing positive for TB should **never** have another TB skin test. They have a higher than normal risk of having a more severe local reaction.



Figure 2. A positive Mantoux test shows redness and induration (swelling) 48 to 72 hours after the test. (source: CDC/Osiris/Edwards)

© 2004 The Learning, an an of Oregon Health Services, LLC. ALL RIGHTS RESERVED.

<https://apps.legislature.ky.gov/law/kar/titles/902/020/205/> - applies to healthcare workers

<https://apps.legislature.ky.gov/law/kar/titles/902/020/200/> - applies to LTC facilities



TB Blood Tests

- ❖ The FDA has approved the QuantiFERON-TB Gold Test and the T-SPOT TB test. These blood tests determine if a person has the TB germ.
- ❖ They do NOT tell you whether a person has **active** TB disease or **latent** TB infection.
- ❖ Blood is collected by a health care provider and sent to a laboratory for processing. Blood samples must be processed within 8-16 hours after collection. Results can be available in 24 hours.
- ❖ Only one visit to the health care provider is required.



Testing for Active TB



- ❖ Testing the **sputum** for AFB smear and culture is a definitive test for TB. It shows if acid-fast bacilli (**AFB**) are present.
- ❖ Positive AFB tests do NOT absolutely prove that the person has **active** TB. There are other germs that will also result in positive AFB tests. When the culture is AFB positive, further testing will be done to identify whether the germ is TB or another germ.
- ❖ MTB DNA PCR testing will detect TB DNA, dead or alive. It is available in-house or through a reference lab.
- ❖ It is necessary to collect a specimen for AFB testing when collecting MTB DNA PCR.
- ❖ If one of the tests is positive, the person is usually considered to have **active** TB.
- ❖ Specimens containing saliva will be rejected by the lab.



Testing for Active TB - (continued)

- ❖ **AFB smear & culture** - **Three** sputum samples are collected. Each should be at least **8 hours** apart and at least one should be an **early morning** specimen.
 - ❖ If an AFB was obtained during bronchoscopy, then a post-bronchoscopy AFB should be obtained.
 - ❖ If the three specimens or the bronchoscopy/post-bronch specimens are AFB smear negative, the patient may be removed from airborne isolation precautions.
- ❖ **MTB DNA PCR** – **Two** sputum specimen are collected, at least **8 hours** apart, with one being an **early morning** collection. **Additionally, a sputum specimen for AFB testing is collected.**
 - ❖ If collection occurred during a bronchoscopy, then a post-bronchoscopy specimen should be obtained.
 - ❖ If two specimen are MTB DNA PCR negative, the patient may be removed from isolation.
 - ❖ MTB DNA PCR testing can be done in-house.






Chest X-Rays


- ❖ Chest x-rays are an important diagnostic tool. They **cannot** be used alone to diagnose TB.
- ❖ In the past, healthcare workers with positive **TSTs** had x-rays taken annually.
- ❖ Routine yearly x-rays **are no longer** necessary. An annual symptom screening will be done for those employees.



QUESTION

Evaluation for tuberculosis includes:

-  a physical exam, tuberculin skin test or TB blood test, chest x-ray, and sputum smear and culture
-  a stool sample
-  an MRI

Click on the  next to the correct answer



Treatment Plan

- ❖ A drug used to treat latent TB infection is **INH**.
- ❖ It is sometimes used with 2-3 other drugs to treat **active** TB disease. It is normally taken for 6 to 9 months.
- ❖ It is extremely important that people who have TB disease take the drugs **exactly** as prescribed.
- ❖ If they stop taking the drugs too soon, or take them incorrectly, the germs may become resistant to the drugs. This makes TB harder to treat.
- ❖ Also, when this resistant germ is passed to another person, their TB is harder to treat.



OSHA Guidelines

The Occupational Safety and Health Administration (OSHA) publishes and enforces national guidelines for TB infection prevention.

The three primary goals of the TB infection prevention plan are:

- ❖ early detection
- ❖ prompt isolation
- ❖ prompt treatment



Guidelines

Patients will be asked questions to determine if they have **signs and symptoms** of tuberculosis.

If the patient does have signs and symptoms of TB, the patient will be placed in **airborne precautions**, unless the physician confirms the symptoms are related to another diagnosis. The patient's illness may **not** be caused by TB. It could be:

- ❖ pneumonia
- ❖ bronchitis
- ❖ chronic lung disease
- ❖ lung cancer

In Meditech, the Special Indicator “TB Rule Out –Tests Pending” is selected. If the patient is confirmed to have active TB, the Special Indicator is changed to “TB Diagnosed”.



QUESTION

OSHA's tuberculosis prevention plan emphasizes which of the following?

- early detection
- prompt isolation
- prompt treatment
- all of the above

Click on the next to the correct answer



QUESTION

If a patient shows some symptoms of TB, it could be pneumonia, bronchitis, chronic lung disease, or lung cancer.

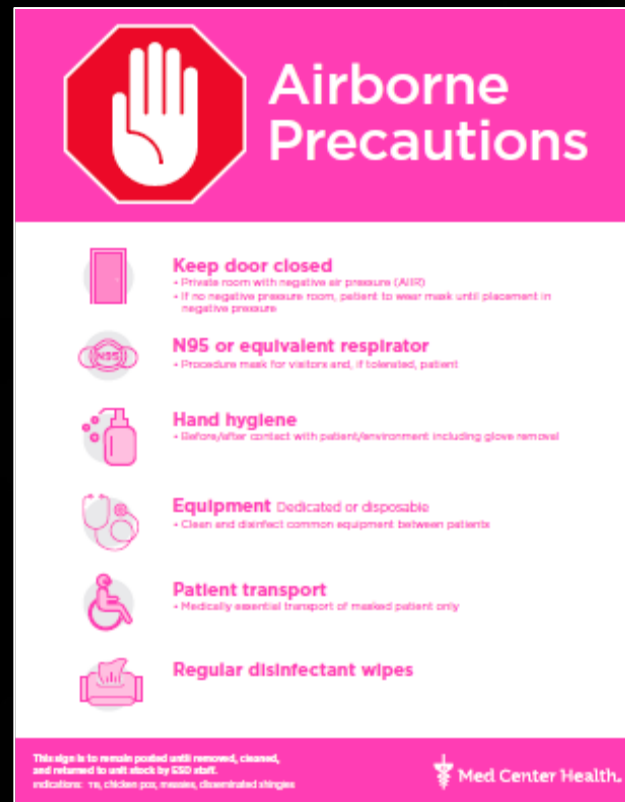
 True

 False

Click on the  next to the correct answer



Updated Isolation Signage



Updated sign



Engineering Controls




Isolation/Precautions

- ❖ Place **Airborne Precautions** sign in plain view at the entrance of isolation rooms.
- ❖ The pressure in the room must be less than the pressure in the hallway allowing air to flow into but **not** out of the room (negative pressure).
- ❖ Keep the doors to the room closed at all times.
- ❖ Air from a negative pressure room is exhausted to the outside of the hospital and is **not** recirculated into the building.
- ❖ Negative pressure is monitored daily by Engineering.
- ❖ After the patient is discharged, the door to the room should be left closed for one hour to allow for complete room air exchange. If personnel must be in the room during this time, the appropriate respirator must be worn.



QUESTION

Which of the following statements is true of negative pressure isolation rooms (AIIR)?

-  Negative pressure isolation rooms should have airborne isolation precaution signs in plain view.
-  Air flows outside negative pressure isolation rooms and into hallways and lobbies.
-  It is acceptable to leave negative pressure isolation room doors open into public hallways.

Click on the  next to the correct answer





Personal Protective Equipment Respiratory Protection Program

Hospital personnel entering an **airborne isolation** room should only wear the size and type respirator they were fit-tested for.

- ❖ Employees whose positions require the use of respirators receive an annual Respiratory Protection Evaluation along with their annual TB Skin Test in Employee Health.
- ❖ Employees who are unsure of their appropriate respirator should contact Employee Health at Ext. 1263.
- ❖ A fit check is performed each time that the respirator is worn. This is done by tightly crimping the respirator across the bridge of the nose. Next, exhale forcefully with the mouth open while feeling around the edges of the respirator to make sure that there is no air leak. Last, inhale forcefully through mouth to see if the respirator moves in with your breath.
- ❖ Those who were fitted for powered air purifying respirators (PAPRs) should only wear a PAPR. Make sure the device is always placed back on the charging unit.



Patient Care Measures



- ❖ Encourage patients to cough into a tissue.
- ❖ TB patients **must** wear a mask if they leave their room (Never place an N-95 on a patient or visitor – use surgical masks).
- ❖ TB patients are no longer considered contagious when they are on appropriate medication **and**
 - their symptoms improve
 - sputum smears are negative for AFB x 3 (this usually happens within 2 weeks after therapy begins).
- ❖ Patients who have a sputum specimen collected during a bronchoscopy for AFB testing should also have a sputum specimen collected after the bronchoscopy for AFB testing.
- ❖ The physician, along with hospital policy based on CDC guidelines, can determine when a patient's isolation can be discontinued.




REVIEW QUESTION

A face shield or surgical mask may be used in place of a respirator when entering an airborne isolation room, if a respirator is NOT readily available.

 True

 False

Click on the  next to the correct answer



Exposure Follow-up

- ❖ If a healthcare worker is exposed to an undiagnosed active TB patient who is NOT properly isolated, every attempt will be made to identify all other exposed employees.
- ❖ Initial testing will be performed by Infection Prevention as soon as possible after it has been determined that an exposure occurred.
- ❖ Follow-up TB screening/testing will be performed at least 10-12 weeks after the last date of exposure. If screening/testing is completed before 10 weeks, it is possible that a conversion would be missed because TB is a very slow growing organism.



Remember:

- ❖ To pass TB on to someone else, a person will have the symptoms previously discussed. These symptoms are also listed on the TB Risk Assessment Form (from Employee Health), as well as the TB screening tool which is completed on every patient.
- ❖ TB skin test and TB blood tests (Tspot or TB Gold tests) are screening tests; these tests are not vaccines.



Exposure Follow-up

If transmission of TB infection in a staff member is documented, other healthcare workers in the same work area will be tested to determine if there are any additional new converters.

If additional converters are found, a problem evaluation will be initiated to determine if the following are responsible:

- ❖ patient detection
- ❖ isolation practices
- ❖ engineering controls

Identified problems will be addressed and corrected promptly.



Test Results and Documentation

The results of all employee medical evaluations, TB skin tests, post-exposure evaluations, and respirator fit-testing results will be recorded in the employee's medical records and maintained in Employee Health.

Documented new conversions and cases of active TB in employees will be recorded on the OSHA Log in the manner required by OSHA.



In Summary.....

- ❖ Understand what tuberculosis is and how it is transmitted.
- ❖ Be familiar with the signs and symptoms of TB.
- ❖ Know this facility's policies and procedures.
- ❖ Follow OSHA regulations.
- ❖ Report all possible TB exposures.
- ❖ Complete all suggested follow-up procedures if you are exposed to TB.

For more information about tuberculosis contact Infection Prevention at Ext. 1145 or Employee Health at Ext. 1263.

Click the Take Test button to complete a short quiz

- You will have three chances to pass the test.
- If you do not pass the test after the third attempt, please contact Infection Prevention at x1581 to make arrangements to retake the test.
- Passing score is 80%.





Return to Course



Return to Course



Return to Course



Return to Course



Return to Course



Return to Course



Return to Course



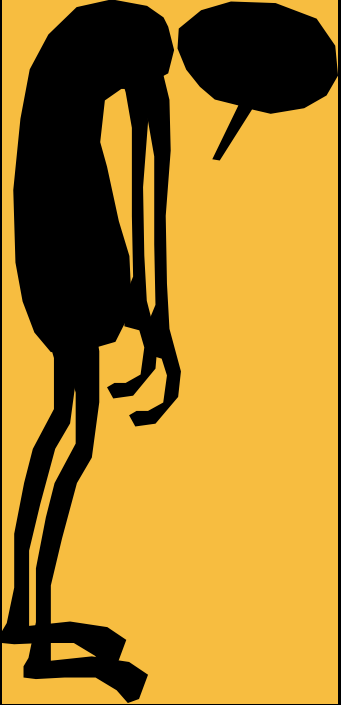
Return to Course



Return to Course

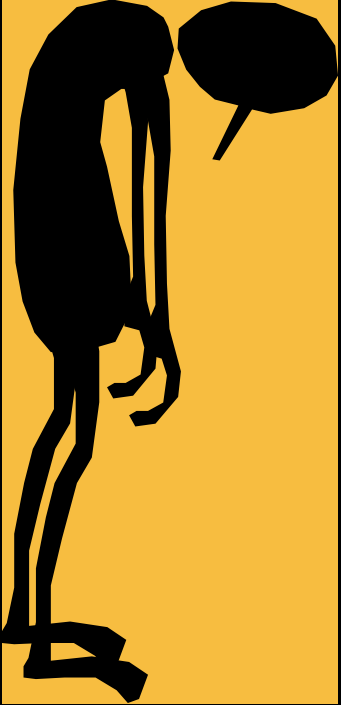


Return to Course



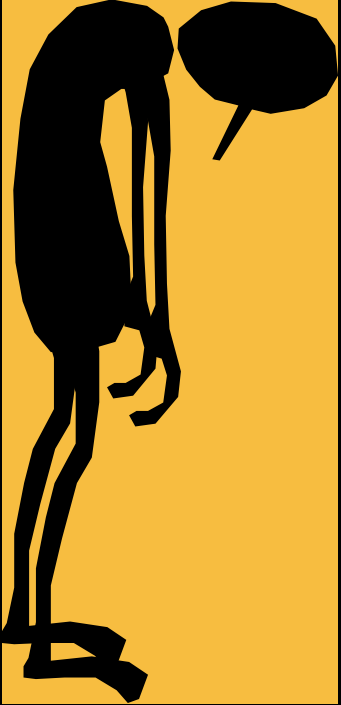
Try Again

[Return to Course](#)



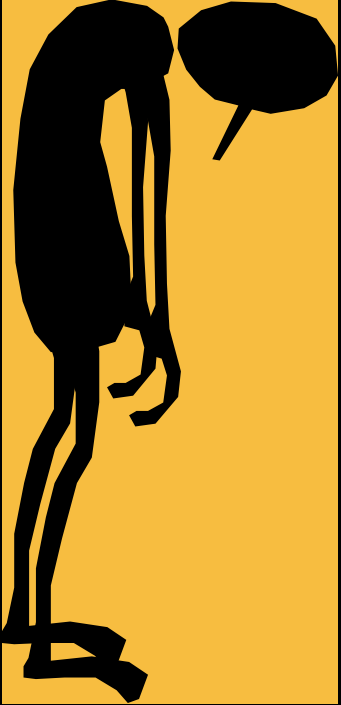
Try Again

[Return to Course](#)



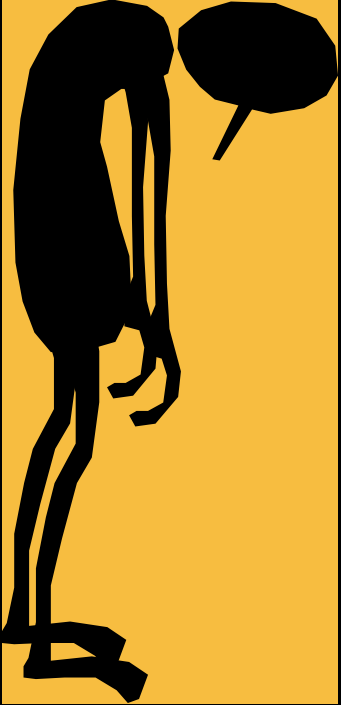
Try Again

[Return to Course](#)



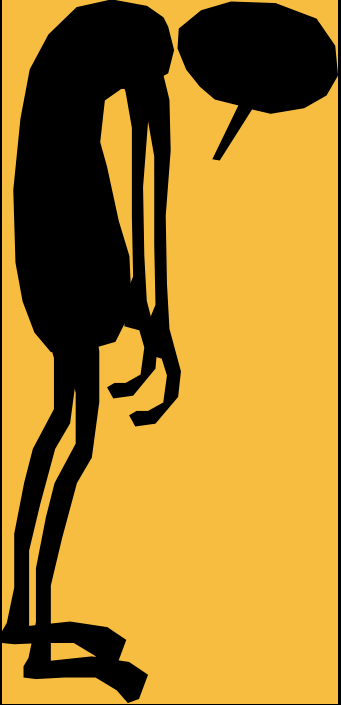
Try Again

[Return to Course](#)



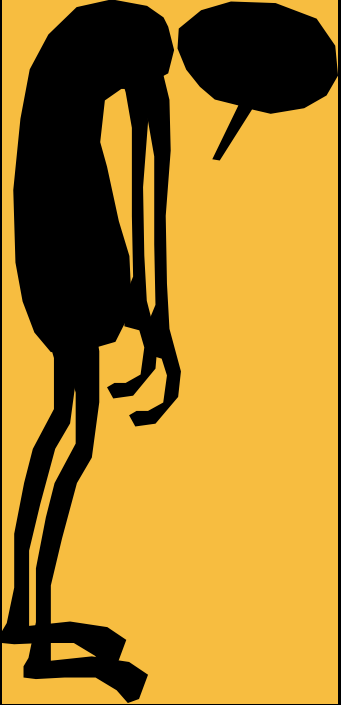
Try Again

[Return to Course](#)



Try Again

[Return to Course](#)



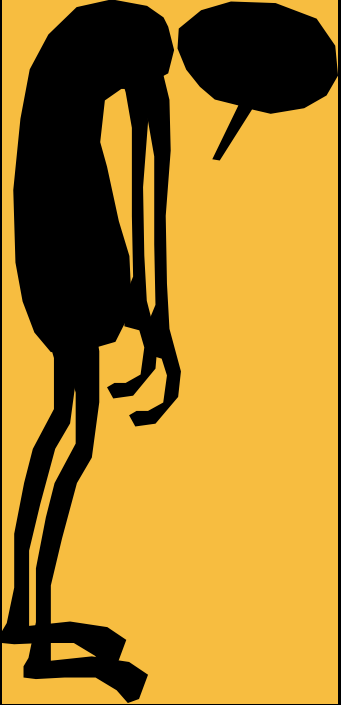
Try Again

[Return to Course](#)



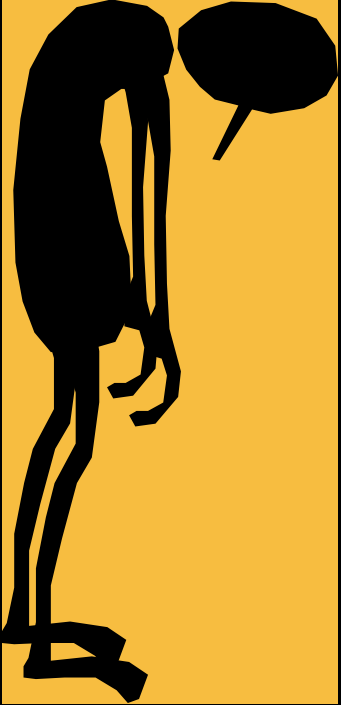
Try Again

[Return to Course](#)



Try Again

[Return to Course](#)



Try Again

[Return to Course](#)