DISEASES SPREAD THROUGH RESPIRATORY SECRETIONS

A. Introduction

Many diseases are spread through the respiratory droplets that spray into the air when an infected person coughs or sneezes. These germs can spread from person-to-person, or when someone touches a surface with respiratory germs on it and then touches their mouth or nose.

(See the Glossary for explanations on airborne and respiratory droplet transmission.)

In this section you will find information on the following diseases:

- Influenza
- Group A streptococcus
- Meningococcal disease
- Tuberculosis (airborne spread)

B. Influenza

Influenza (commonly known as "the flu") is a serious, acute respiratory infection that is caused by a virus. People of any age can get the flu. Most people who get influenza are ill for only a few days, but some people can become very sick and will need to go to an emergency room or to the doctor's office.

Please note that influenza is a reportable disease and must be reported to YRCHS for appropriate follow-up.

Transmission

Flu spreads easily from infected people beginning 24 hours prior to the onset of symptoms and for the first three to five days of illness in adults and for 7 to 10 days in children through coughing and sneezing. It is also spread through direct contact with contaminated surfaces, unwashed hands, or objects such as toys and eating utensils, that have been contaminated by the influenza virus. Typically, the transmission occurs through direct hand-to-mouth contact with surfaces contaminated with droplets, rather than direct mucous membrane contact splatter from sneezes or coughs. Therefore, hand hygiene is the foremost personal protective measure.

Symptoms

People who get influenza may experience some or all of the following symptoms: cough, fever, chills, sore throat, headache, muscle aches and fatigue. Young children may also experience gastrointestinal symptoms. Illness due to influenza usually lasts from three to five days but can last longer. The cough and fatigue can persist for several weeks, making the return to work and personal activities difficult.

Prevention/Treatment

Anyone who wants to avoid getting the flu should consider getting vaccinated, as it can prevent much of the illness caused by the flu. The vaccine is especially important for people in high-priority groups such as healthcare workers and essential service workers (i.e., paramedics, fire and police). By receiving the flu vaccine, individuals may decrease the risk of bringing the influenza virus home to a baby, older relative, clients or someone with a medical condition who can develop serious complications from influenza.

The viruses that cause influenza change often. As a result, each year there is a new vaccine to protect against the flu strains that are expected in the coming flu season. The current year's vaccine typically protects against the most common circulating strains. Protection from the vaccine develops approximately two weeks after receiving the vaccine, and may last up to one year. The vaccine is about 70 to 90 per cent effective in preventing influenza infection in healthy adults. People who receive the vaccine can still get influenza, but if they do, it is usually milder than it would have been without the shot.

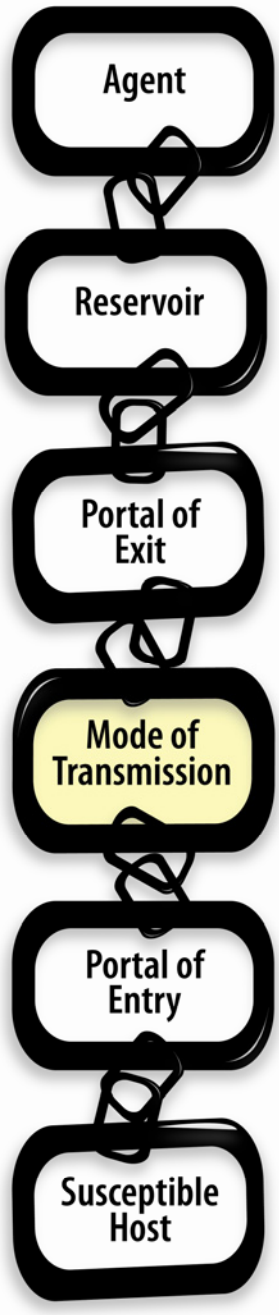
The recommended treatment is to stay home from work, school or social gatherings, and rest whenever possible until symptoms have resolved. Drink plenty of fluids such as water and fruit juice. Seek medical attention if necessary.

What do you do if you think you have been exposed?

If an emergency services worker has been exposed to influenza, he or she should notify the designated officer. Antiviral medications can be prescribed for people who do get sick. These help to reduce the sick period by one to two days if started within 48 hours after the onset of the illness.

For more information, read our Influenza and Vaccine Fact Sheet

INFLUENZA (FLU) CHAIN OF TRANSMISSION



Agent

Various strains

- The influenza virus strains that cause the flu change from year to year

Reservoir

Persons infected with influenza

- Saliva and droplet secretions from the mouth, nose or throat of an infected person

Portal of Exit

Mouth and nose of infected person

Mode of Transmission

- Respiratory droplets from an infected person
- Direct contact with unwashed hands or contaminated surfaces and objects

Break the chain of transmission here by using Personal Protective Equipment and practice good hand hygiene

Portal of Entry

Mucous membranes of the mouth, throat or nose

Susceptible Host

Any individual exposed to the virus

- Immunocompromised, young and elderly are at a higher risk

Annual vaccination is effective in about 70 to 90 per cent of healthy adults and 80 to 90 per cent of children. The viruses that cause the flu change from year to year so new vaccines are made every year.

Remember: Break the Chain, Stop Infection!

C. Group A streptococcus

Group A streptococcus bacteria (group A strep or GAS) cause a variety of infections. The most frequent conditions include sore throat (commonly called strep throat), ear infections, scarlet fever and skin infections. In rare cases, GAS can invade sterile body cavities or tissues and produce severe illness (invasive group A strep infections) such as:

1. Necrotizing Fasciitis (i.e., Flesh-Eating Disease), which is a soft tissue infection characterized by rapidly spreading inflammation and death of muscle and fat tissues
2. Streptococcal Toxic Shock Syndrome (STSS), which is a severe infection associated with low blood pressure, shock and multi-organ failure
3. Meningitis
4. Pneumonia

Please note that Invasive Group A streptococcus is a reportable disease and must be reported to YRCHS for appropriate follow-up.

Transmission

Group A streptococci are found in the nose and throat of about five to ten per cent of healthy children and one per cent of healthy adults. People who have no signs or symptoms of illness are not very contagious. The risk of spread is greatest from an ill individual. The bacteria can spread through close, personal contact with an infected person, such as through kissing, sharing cutlery, or having direct contact with infected sores on the skin. Bacteria can enter the body through breaks in the skin, cuts, surgical wounds or chickenpox lesions.

Symptoms

The early signs and symptoms of invasive group A strep infection can include: fever, cough, confusion and headache. Necrotizing Fasciitis often starts with severe pain at the wound site. Early signs and symptoms of Streptococcal Toxic Shock Syndrome (STSS) include fever, dizziness, confusion, diffuse rash and abdominal pain. These symptoms can occur with other illnesses and make STSS sometimes difficult to diagnose.

Incubation period

The time between exposure and development of symptoms is usually from one to three days.

Prevention/Treatment

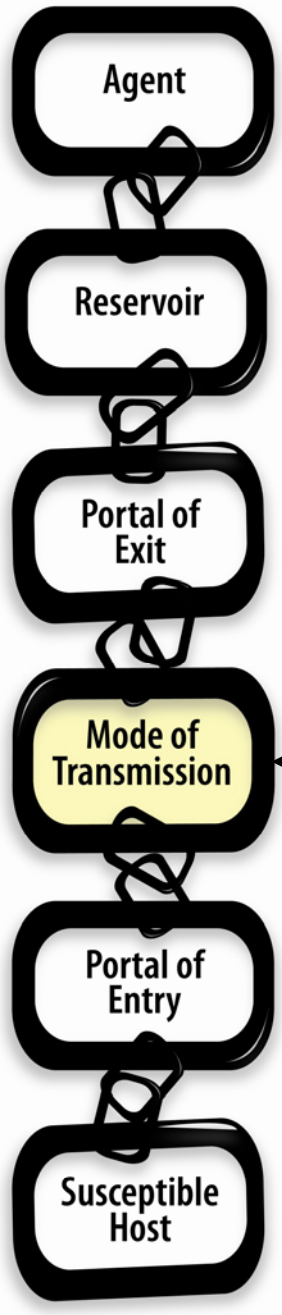
Antibiotics are commonly used to treat group A strep in adults and children.

What do you do if you think you have been exposed?

Individuals who have had close contact with a person with invasive group A streptococcal disease should consult their physician immediately. The local public health department will determine the level of risk for contacts of reported cases and determine if prophylactic antibiotics are appropriate. Few people who come in contact with invasive group A strep develop invasive disease. While healthy people can develop invasive disease, people with chronic illnesses such as cancer or diabetes and those on kidney dialysis and long term steroid use are at higher risk.

For more information, read our Group A Streptococcus Fact Sheet

GROUP A STREPTOCOCCAL CHAIN OF TRANSMISSION



Bacteria called group A streptococci (*Streptococcus pyogenes*, group A)

Nasal passages or skin lesions from an infected person

Nasal secretions or skin lesions of an infected person

Respiratory droplets or direct contact with the mucous membranes of an infected person or carrier

Break the chain of transmission here by using Personal Protective Equipment

Nose, mouth, throat or skin wounds

- Any break in the skin (e.g., cut, surgical wound or chickenpox lesion) may provide the opportunity for the bacteria to enter

Healthy people can get the invasive disease, but individuals with chronic illnesses or immunocompromised are at a higher risk.

These bacteria are found in the nose and throat of about five to 10 per cent of healthy children and one percent of healthy adults who have no signs and symptoms of illness.

Remember: Break the Chain, Stop Infection!

DECISION TREE: POSSIBLE EXPOSURE TO INVASIVE GROUP A STREPTOCOCCUS

Exposure to invasive Group A streptococcus

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Report to **Designated Officer**

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Designated Officer assesses risk*****

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Risk Established | **No Risk Established**

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Consult with a delegate of the Medical Officer of Health by calling Health Connection at 1-800-361-5653

Counsel Employee re disease transmission and provide educational resources

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A delegate of the Medical Officer of Health confirms diagnosis of source

→ No risk of Invasive Group A Streptococcus

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A delegate of the Medical Officer of Health informs Designated Officer of risk status

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A delegate of the Medical Officer of Health counsels employee re: disease transmission and provide educational resources

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Diagnosis is Invasive Group A Streptococcus

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A delegate of the Medical Officer of Health informs Designated Officer of risk status. If post-exposure prophylaxis is recommended, both the designated officer and the exposed personal will be notified.

***The designated officer will consider the following:**

- Was the diagnosis confirmed?
- How much of a substance was present in the environment and how much of it did the person come in contact with?
- Was there direct contact with the reservoir that carries this disease?
- How long was the exposure?
- Was protective clothing and/or equipment used that should have prevented the transmission of the disease (e.g., gloves, eye protection, mask)?
- Was the personal equipment compromised?
- Is the person susceptible?
- Was there an appropriate "route of entry" for the disease in question?

D. Meningococcal Diseases

Meningococcal disease is caused by bacteria called *Neisseria meningitidis*. Two serious forms of meningococcal disease are meningitis and meningococcemia.

- Meningococcal meningitis occurs when the *N. meningitidis* bacteria infect the membrane that surrounds the brain and spinal cord and cause inflammation.
- Meningococcemia occurs when the *N. meningitidis* bacteria gets into the bloodstream.

Meningococcal disease occurs in people of all ages, most often in winter and spring. About one-third of cases are in adults, and the spread of the disease is more common among adults living in crowded conditions, such as school dormitories. However, most adults have acquired a natural immunity to the disease. In most people, the chance of becoming infected is low and it usually decreases with age. **Emergency services workers are rarely at risk when caring for people who have meningitis.**

Please note that meningococcal disease is a reportable disease and must be reported to YRCHS for appropriate follow-up.

Transmission

About one person out of twenty carries the bacteria that cause meningococcal disease in their nose and throat without becoming ill. It is not known why some people become ill and others do not. The disease is spread through direct contact with the discharges from the nose and throat of a carrier or a person who is ill with the disease. The bacteria can be spread through kissing or by sharing a drinking cup, a cigarette, food or lipstick. There is no risk from sitting next to someone who carries the bacteria. In an emergency situation, emergency service workers may be exposed to the bacteria through mouth-to-mouth resuscitation without a mouthpiece; however, there is no known case of an emergency worker being infected in this way.

Symptoms

Symptoms include fever, intense headache, nausea, vomiting, stiff neck and often a rash (especially with meningococcemia). The person may be sensitive to light, become delirious or irritable or lapse into a coma.

Incubation Period

Once infected with the meningococcal bacteria, it takes between one and ten days (but usually less than four days) to develop symptoms.

Prevention/Treatment

Rifampin and Ceftriaxone are the medications commonly used to treat meningococcal disease in adults and children.

There are several vaccines available in Canada to prevent certain strains of meningococcal disease. Emergency services workers should ensure that their immunizations are up-to-date.

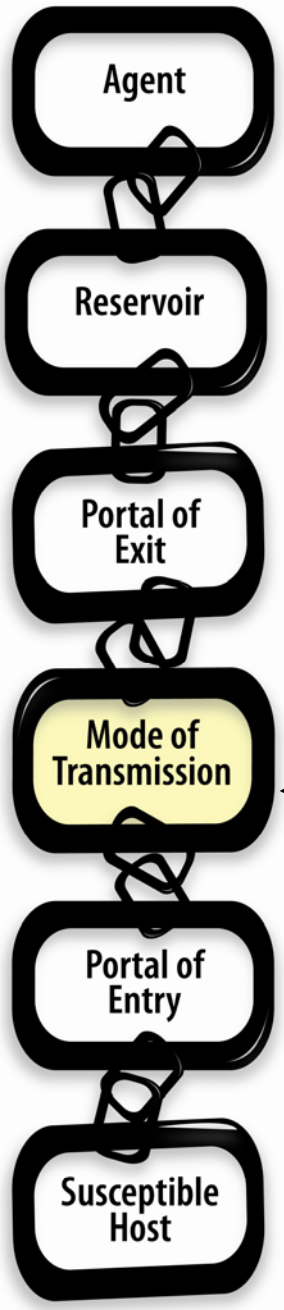
After a case or an outbreak is confirmed and there has been a probable exposure, vaccination and/or prophylaxis may be recommended by your local public health department.

What do you do if you think you have been exposed?

People who have had intimate or direct exposure to a person with meningococcal disease should consult their physician and their designated officer immediately. The local public health department can help to determine their level of risk. Early recognition of meningococcal infection and prompt treatment greatly improve chances of survival.

For more information, read our Meningococcal and Vaccine Fact Sheet

MENINGOCOCCAL DISEASE CHAIN OF TRANSMISSION



Agent

Bacteria called *Neisseria meningitidis*

Reservoir

Saliva and secretions from the mouth, nose and throat of infected persons

Portal of Exit

Mouth and nose of infected person

Mode of Transmission

DIRECT CONTACT with the saliva or secretions from the mouth, nose or throat of an infected person. Droplet contact usually requires a distance of one metre or less with a patient who is actively coughing/sneezing

Break the chain of transmission here by using Personal Protective Equipment

Portal of Entry

- Mouth, throat, nose
- Inhalation of bacteria to lungs or transfer of organism from contaminated hands/gloves to face/mouth

Susceptible Host

Anyone, although approximately 10 per cent of the population have the bacteria in their mouth/throat and do not become ill

Remember: Break the Chain, Stop Infection!

DECISION TREE: POSSIBLE EXPOSURE TO MENINGOCOCCAL DISEASE

Exposure to case of Meningococcal Disease

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Report to **Designated Officer**

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Designated Officer performs a risk assessment to identify the possibility of "shared saliva"

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Risk Established

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Designated Officer consults with a delegate of the Medical Officer of Health by calling Health Connection at 1-800-361-5653

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A delegate of the Medical Officer of Health confirms diagnosis of source

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Diagnosis is Meningococcal Disease (bacterial)

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A delegate of the Medical Officer of Health informs the Designated Officer of risk status. If post-exposure prophylaxis is recommended, both the Designated Officer and the exposed personal will be notified.

No Risk Established

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Counsel Employee re disease transmission and provide educational resources

→ No risk of Meningococcal Disease

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A delegate of the Medical Officer of Health informs Designated Officer that no risk was established

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A delegate of the Medical Officer of Health counsels employee re: disease transmission and provides educational resources

***The designated officer will consider the following:**

- Was diagnosis or case confirmed?
- How much of a substance was present in the environment and how much of it did the person come in contact with?
- Was there direct contact with the medium that carries this disease?
- How long was the exposure?
- Was protective clothing and/or equipment used that should have prevented the transmission of the disease (e.g., gloves, eye protection, mask)?
- Was the personal equipment compromised?
- Was there an appropriate "route of entry" for the disease in question?

E. Tuberculosis

Tuberculosis (TB) is a disease that spreads through the airborne route and is caused by *Mycobacterium tuberculosis* bacteria. TB usually affects the lungs (pulmonary TB), but can also affect any other area of the body (extrapulmonary TB) such as the spine, brain, or bone. Only pulmonary TB is infectious. TB is a curable and preventable disease.

TB is a reportable disease and must be reported to YRCHS for appropriate follow-up. Reporting of a TB case or exposure to YRCHS can wait until the next business day.

Transmission

Risk: TB is a difficult disease to catch since transmission requires close, prolonged contact with someone who has active disease in his/her lungs or throat. Individuals with active TB disease in their lungs are most likely to spread it to people they spend time with everyday, such as family, classmates and co-workers. The less time you are exposed, the less likely you are to acquire TB.

How TB is transmitted: TB bacteria spread from person-to-person through the air. TB bacteria are projected into the air by coughing, singing or yelling. When a person inhales the air that contains the TB bacteria, the bacteria lodge in the lungs and begin to multiply, and the person becomes infected.

TB Infection: In most people who become infected, the body's immune system is able to fight the bacteria to keep them from multiplying. The bacteria are not killed, but they become inactive (dormant) and are stored in the body. At this stage the person is considered to have a **TB infection** (also known as Latent TB Infection or LTBI). If not adequately treated, latent TB infection has the potential to become active disease at any time, including years later. A person who has latent TB infection usually has a positive tuberculosis skin test and is not infectious.

TB Disease: TB disease occurs when the inhaled TB bacteria awaken out of dormancy and begin to multiply. **Only TB of the lungs and respiratory tract are infectious to others**. Environmental surfaces contaminated with TB bacteria are not considered a source of infection.

Symptoms

The general symptoms of TB disease are:

- Cough that lasts longer than three weeks
- Weight loss
- Night sweats
- Fatigue
- Coughing up blood (rare)
- Low grade fever

Incubation Period

The time from exposure to a positive TB skin test (indicating infection) is at least eight weeks. There is no incubation period for TB disease.

Prevention/Treatment

- Your baseline skin test results (a 2 step test is recommended) should be recorded on your immunization record, so that in the event of an exposure, your doctor has a comparison for any repeat skin tests that may be required. The TB skin test is a subdermal injection of TB protein derivative that indicates if you have been infected with TB bacteria at some point in your life.
- Wear an N-95 mask when interacting with people who appear to have a respiratory infection or are known cases of infectious pulmonary TB.

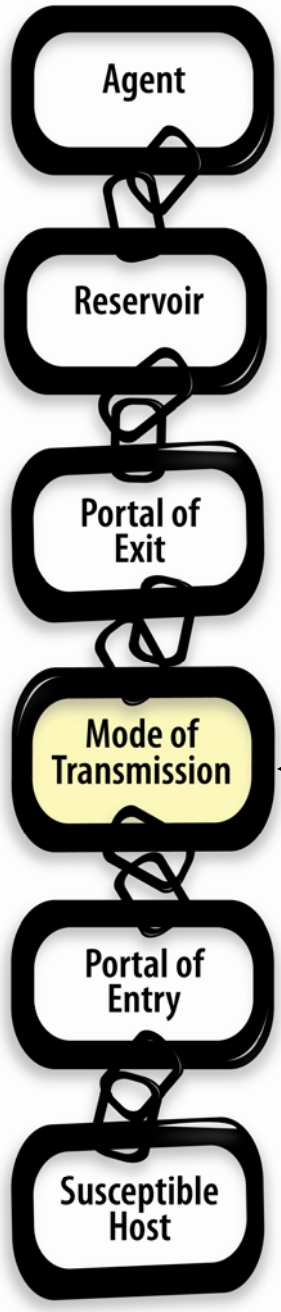
Both latent TB and active TB can be treated. Medication for TB disease and infection are available by prescription. This medication is provided free of charge. If you are prescribed treatment for TB infection or disease, it is important to take the medications exactly as prescribed.

What do you do if you think you have been exposed?

If you have had significant exposure to a person with infectious pulmonary TB disease, see a health care professional to have a TB skin test done. If your test is 'positive,' your doctor will refer you to a specialist for further evaluation (e.g., chest x-ray) to ensure you do not have active TB disease.

For more information about TB, visit www.york.ca/TB

TUBERCULOSIS (TB) CHAIN OF TRANSMISSION



Bacteria called *Mycobacterium tuberculosis*

Often the lungs, but can be found in other body parts

- sputum and saliva are of primary concern

Mouth and nose of the coughing patient

AIRBORNE – Coughing releases bacteria into air, which then can be inhaled by others

Break the chain of transmission here by using Personal Protective Equipment

Mouth and nose of people in the same room/area as the coughing/sneezing patient

- bacteria inhaled into lungs of new host

Theoretically anybody

- At greater risk are the young, the elderly, the immuno-compomised and those living in overcrowded conditions.

Remember: Break the Chain, Stop Infection!

DECISION TREE: POSSIBLE EXPOSURE TO TUBERCULOSIS (TB)

Exposure to an Active TB Case

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Designated Officer assesses the exposure

Significant Exposure

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Consult with YRCHS TB Team by calling 905-830-4444 extension 6000

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The TB Team diagnosis of source

Diagnosis is infectious pulmonary TB

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The TB Team informs Designated Officer of risk status

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Emergency services worker will have a TB skin test unless the worker has had a previous positive TB skin test

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The TB Team will follow up with person regarding test results and any further action that might be required

No Significant Exposure

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Counsel employee regarding disease transmission and provide educational resources

Diagnosis is something other than active pulmonary TB

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The TB Team informs the Designated Officer of risk status

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Designated officer counsels employee regarding disease transmission and provides education resources

***The designated officer will consider the following:**

- Was the patient infectious?
- Was diagnosis confirmed and was there prolonged close contact?
- Was the patient coughing?
- How long was the exposure?
- Was the environment crowded or poorly ventilated?
- Was protective equipment used that should have prevented the transmission of the disease (e.g., mask)?
- Was the personal equipment compromised?