



Tuberculosis

Guidance for health-, social-, and cleaning workers.

Tuberculosis is an infectious disease caused by the tuberculosis bacterium, *Mycobacterium tuberculosis*. They usually cause lung infections but can spread anywhere in the body. People with an infection of the lungs or larynx can infect others with tuberculosis. Children who have not reached sexual maturity are not contagious. People with tuberculosis disease only outside the lungs (e.g. lymph nodes or bones) are not contagious. These individuals therefore generally do not require isolation or special infection prevention when visiting or cleaning such patients, only [basic aseptic techniques](#). An exception to this is, for example, sampling of infected tissue.

Infection routes

Tuberculosis infection occurs when a person inhales aerosols or droplets produced when a patient with *infectious* tuberculosis:

- cough
- Sneeze
- Sings
- playing wind instruments
- speaks (reduced risk of infection)

Tuberculosis is not infected:

- touch such as a handshake
- with common equipment such as tableware, light switches, and toilet seats.

Infection prevention

1. **Aeration:** The more a patient blows, coughs, or sneezes, the greater the risk of infecting others using the same confined space, simultaneously with the patient or shortly after the patient leaves the space. Spaces used by the patient indoors (bedrooms, dining facilities, etc.) need to be aerated thoroughly, during and after the patient uses them, preferably before others use them. Outdoors there is a low risk of transmission except in direct (face-to-face communication, such as conversation) close.
2. **Isolation:** Patients with *infectious* tuberculosis need to avoid contact with other persons, i.e. isolation. Patients in isolation should sleep in a room not used by others while the patient is contagious. When indoors, patients in isolation should stay as much as possible in accommodations that others do not use. Patients in isolation may

stay outdoors but should have a **mask** available to wear if proximity to others is unavoidable.

3. **Masks:** If staying in the same space as an infectious tuberculosis patient indoors is necessary, both patient and staff member should wear masks. FFP2/N95 masks are desirable for protecting against aerosol and droplet transmission, but very sick patients may have difficulty breathing with such a mask and will need to wear a so-called surgical mask. Such masks reduce the spread of larger droplets but have less effect on aerosols. When communicating directly outdoors close, at least the patient should wear a mask. Please note that valve masks are not suitable for infectious individuals to protect others.

Latent TB infection

Most people who inhale tuberculosis bacteria do not get sick immediately. Most people's immune systems keep the tuberculosis bacteria sealed off and inactive, but fail to kill them all. This is called latent tuberculosis, or tuberculosis infection. People with latent tuberculosis are not sick and have no symptoms or signs of tuberculosis, but have a positive response to a tuberculosis test (skin test or blood interferon release test). Latent tuberculosis is not contagious, but infection is treated to prevent a person from later contracting tuberculosis. The treatment of latent tuberculosis is easier for most people than treating tuberculosis (fewer medications and/or shorter periods).

Tuberculosis (disease of tuberculosis, active tuberculosis)

Tuberculosis is an active disease in which tuberculosis bacteria multiply and cause damage to the body. This happens if the immune system cannot block the growth of the tuberculosis bacteria.

Signs of active tuberculosis include:

- New or worsening cough that has lasted 3 weeks or more.
- Fever ($\geq 38^{\circ}\text{C}$) – persistent/recurring.
 - Shiver.
 - Night sweats.
- Feeling tired or weak.
 - Paleness, and anemia for long periods of illness.
- Unexplained weight loss, and weight reduction.
- Other symptoms depend on where in the body tuberculosis is, for example:
 - Rhythm pain in the chest (pleura/pleural tuberculosis).
 - Subcutaneous mass/enlarged lymph nodes (tuberculosis of the lymph nodes, often in the neck).
 - Can open, pus rolls them out to the surface via the fistula.
 - Musculoskeletal pain (bone tuberculosis).

- Bone fractures such as vertebral fractures.
- Confusion, somnolence/altered consciousness, convulsions (meningeal tuberculosis).
- Genitourinary symptoms.
- Gastrointestinal symptoms.
- Ear pain and/or fluid from ears.

Contagious tuberculosis

A person with respiratory tuberculosis is contagious if the tuberculosis bacteria are found in sputum or bronchial lavage. The most contagious are those with high levels of bacteria in sputum, which are then seen under a microscope during special staining of the sample. The least infectious are those in whom bacteria cannot be seen; the genetic material of tuberculosis bacteria is not present in a sample, but the bacteria grow after 4–10 weeks of incubation. Generally, isolation is only required if bacteria are observed in sputum on microscopic examination or if genetic material is found in uncultured sputum/bronchial lavage. It is important to repeat sputum tests if illness progresses and/or radiographic changes indicate a higher risk of transmission (such as the formation of a "cavity" in infiltrates that provoked suspected TB on the chest image). Testing must be repeated every few weeks in patients with infectious tuberculosis, at least until the patient has recovered and isolation is lifted. The patient needs isolation while a tuberculosis specialist considers the person contagious.

Multidrug-resistant tuberculosis (MDR-TB)

Tuberculosis bacteria may be resistant to commonly used medicines to treat tuberculosis infections, which is referred to as resistant tuberculosis. It is quite common, then, that there is resistance to at least two medicinal products and is therefore usually referred to as multidrug-resistant tuberculosis.

Situations in which multidrug-resistant tuberculosis may arise:

- The patient has previously received chemotherapy for tuberculosis.
- The patient has stayed in an area with a high incidence of resistant tuberculosis.
- Failure of chemotherapy for tuberculosis (now or before):
 - Inhibition of access to treatment, failure of the patient to properly monitor or treatment, or change of treatment without consulting a physician (e.g. due to cost and/or adverse events).
- Persistent positive microscopic examination (more than 2 months) or positive tuberculosis culture (more than 5 months).
- Contact with a tuberculosis patient with known resistant tuberculosis or to whom any of the above applies.

Institutional response/action on infectious tuberculosis

1) Susceptible tuberculosis

- A patient not required to stay in the hospital should be instructed on [out-of-hospital isolation](#) in a language useful to the patient.
- A patient in the hospital is placed in an isolation clinic, a villa with toilet and bath facilities normal ventilation, and an opening window. Good ventilation with open windows and/or ventilation systems must be maintained.
- The patient should be educated about coughing and sneezing hygiene (covering the senses during coughing/sneezing, using disposable paper towels, bagging immediately after use, and sanitizing hands afterward).
- If a patient undergoes tests outside an isolation room or has the option of walking outdoors, the patient should wear a minimum surgical room mask, preferably a non-ventilated FFP2/N95 mask if tolerated, indoors or close to others outdoors.
- Personnel assisting the patient with cough-inducing aerosol procedures (e.g., sputum collection, suction, bronchoscopy, administration of a medication spray) wear **viral masks (FFP3/N99)** that sit firmly on the face.
- Staff who are in the same space as an infectious tuberculosis patient should wear a viral mask.

2) Multidrug-resistant tuberculosis

- A patient with **suspected** or confirmed multidrug-resistant tuberculosis is admitted to an isolation room (with adjacent toilets and bathing facilities) with a specially designed ventilation system that can be adjusted to **negative pressure**.
- The patient should not leave an isolation room unless necessary and wear an FFP/N95 mask if tolerated, otherwise an operating room mask. Transport/travel routes through an institution should be chosen so that as few others as possible are close to the patient outside the isolation room.
- If the physician's opinion is that a patient can stay in isolation outside the hospital, it must be ensured that he or she has adequate facilities for this **as others do not stay** during isolation. The patient should be instructed [on out-of-hospital isolation](#) in a language useful to him or her and **an understanding of** the main elements of the instructions should be examined by a healthcare professional.
- Staff entering the isolation room should in **all cases** wear a tight viral mask **FFP3/N99**. Outside visitors will need guidance on the risk of infection the use of masks (FFP3/N99) and hand hygiene.

3) Systemic infection prevention (susceptible and resistant tuberculosis)

- If there is a risk of body fluids being splashed or sprayed onto a worker, it is recommended that the worker wear a protective gown, surgical room mask, and goggles/face shield.

- If there is a risk of contact with body fluids (dirty pain), disposable gloves and gowns are worn.
- Hands should be cleaned (washed or sanitized) after contact, after removing disposable gloves, and before leaving the living room.
- The risk of infection should be explained to visiting guests and advised to wear a mask and hand hygiene.

4) Cleaning (sensitive and resistant tuberculosis)

- Trash and dirty linen are bagged inside the living room and handled according to the rules of the institution.
- The isolation room is cleaned daily according to the normal practices of the institution, with soapy water.
- Used utensils are washed in the dishwasher. Used equipment that is dry and without visible contamination is disinfected with surface alcohol (ethanol 70-85 %) otherwise normal cleaning agents are used. As a general rule, cleaning should be done first with soapy water and then disinfecting with alcohol or chlorine mixture.
- After isolation, the living room is thoroughly cleaned with regular cleaning agents.

5) Disinfection (susceptible and resistant to tuberculosis)

- The same disinfectants work against both drug-sensitive and drug-resistant tuberculosis bacteria: alcohol (e.g. surface alcohol), Peric acid substances (e.g. Virkon, hydrogen peroxide), chlorine and also aldehydes and iodine, but they are less suitable for surface disinfection in the environment.
- It is of the utmost importance that disinfection of endoscopic apparatus is carried out in appropriate disinfection washing machines with peracid or aldehyde material. This will ensure the removal of tuberculosis bacteria.

Out-of-hospital isolation

If it is a medical judgment that isolation due to tuberculosis can be carried out outside the hospital, the general rules on infection prevention must be followed. If successful, such isolation is as effective as hospital isolation and is a good option for the patient and much more efficient for society.

Much greater interests are at stake in the case of multidrug-resistant tuberculosis, for the patient, family members, and the community. Therefore, treatment may need to be initiated in hospital isolation even if the patient is slightly ill. If a patient with multidrug-resistant tuberculosis is making good progress, it may be appropriate to continue out-of-hospital isolation when there is marked improvement, monitoring is ensured and appropriate conditions for continued isolation outside the hospital are available.

The patient must agree to comply with all infection prevention protocols and receive thorough guidance on how to isolate in a case that benefits the patient. The CDC's localized route of out-of-hospital isolation in Iceland is available in [Icelandic](#), [English](#), [Polish](#), [Ukrainian](#), [Filipino](#),

and [Lithuanian](#). For other issues and more detailed instructions on medicines etc., please refer, to where English can be used to compose a booklet that is approximately appropriate to the patient's situation (choosing medications, etc.) while having the same booklet prepared in another language with one click of a mouse.

As far as possible, transmission to household members and visitors must be prevented. During isolation, check the following:

1) Out-of-hospital isolation in general

- The patient should be advised to exercise caution in coughing and sneezing, i.e. to cover face with disposable tissue for coughing and sputum. Place the tissue immediately after use in a rubbish bag which is sealed and placed in a trash emptied daily. Hands cleaned afterwards.
- No one else stays in the patient's living quarters, unless necessary up to and including a mask. No one enters a patient's bedroom during isolation without a minimum FFP2/N95 mask, and preferably no other than persons who attend to the patient's welfare and are familiar with quarantine. No one should share a bed with a patient during isolation.
- The patient avoids walking around spaces shared with others as much as possible and wears a mask if they need to walk around common spaces, especially while others are there too.
- At a minimum, the patient and household/guests wear a surgical mask, preferably an FFP/N95 mask, in all contact with others indoors. The mask must be changed at most every 4 hours and discarded after use. Hands should be cleaned after any contact with the mask.
- The patient may stay outdoors at will but should have a clean mask available and put it on if close contact with others is unavoidable.
- The patient must not leave the place of quarantine for purposes other than to obtain fresh air in the vicinity unless there is an urgent need for medical care that cannot be provided at the quarantine site. At a minimum, the patient must wear an operating room mask.
- When seeking healthcare, the patient must report his/her tuberculosis infection.
- Visits, including arrivals of tradesmen and the like, at the place of quarantine minimized during isolation.
- Children 5 years of age and younger and persons with weakened immune systems should not be in the isolation area with an infectious tuberculosis patient or visited. There is a risk of life-threatening infection if tuberculosis infection occurs in individuals in these groups.
- *Everyone* entering the doors of an isolation site during isolation will be educated on mask-wearing and ventilation.
- Visitation preferably takes place outdoors and if the patient is unable to stay outdoors all opening windows/ventilation must be opened and masks worn.

- You need to vent through opening windows and penetrating multiple times a day. If mechanical ventilation is provided, care must be taken to ensure that the air is not reused/blown from the patient's living quarters into other building areas.
- The surfaces of the dwelling are kept dust-free by regular general cleaning.
- Visible fluids entering the environment are dried with paper, disposable gloves should be worn during the task and hand hygiene should be carefully observed. The surface is then cleaned with soapy water.
- Clothing and bedding that have been contaminated with fluid from the airways or wounds are washed in a washing machine at a temperature of at least 60 °C.
- A vacuum cleaner should have a filter. The vacuum cleaner bag must be replaced according to the manufacturer's instructions.

2) In addition, if isolation takes place **in the patient's** home

- Household members are the same as those who lived with the patient immediately before and at the time of diagnosis or fewer.