

# Tuberculosis in Switzerland

The key issues



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA  
Federal Office of Public Health FOPH



LUNGENLIGA SCHWEIZ  
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## Background

This text is based on the current international guidelines for the diagnosis and management of tuberculosis [1–3]. It is an abridged version as a complement to the "Manuel de la tuberculose / Handbuch Tuberkulose 2011". For details, please refer to the full version (<http://www.tbinfo.ch/fr/publications/manuel-de-la-tuberculose.html>).

## Front cover

Rolf Siegenthaler, Berne

## Concept

in flagranti werbeagentur bsw, Lyss

## Composition

Typopress Bern AG, Berne

## Corrections/Printing

Stämpfli Publikationen AG

Reproduction authorized with reference to source  
October 2011/1st edition

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# 1 Role of the physician

## The duties of the physician are:

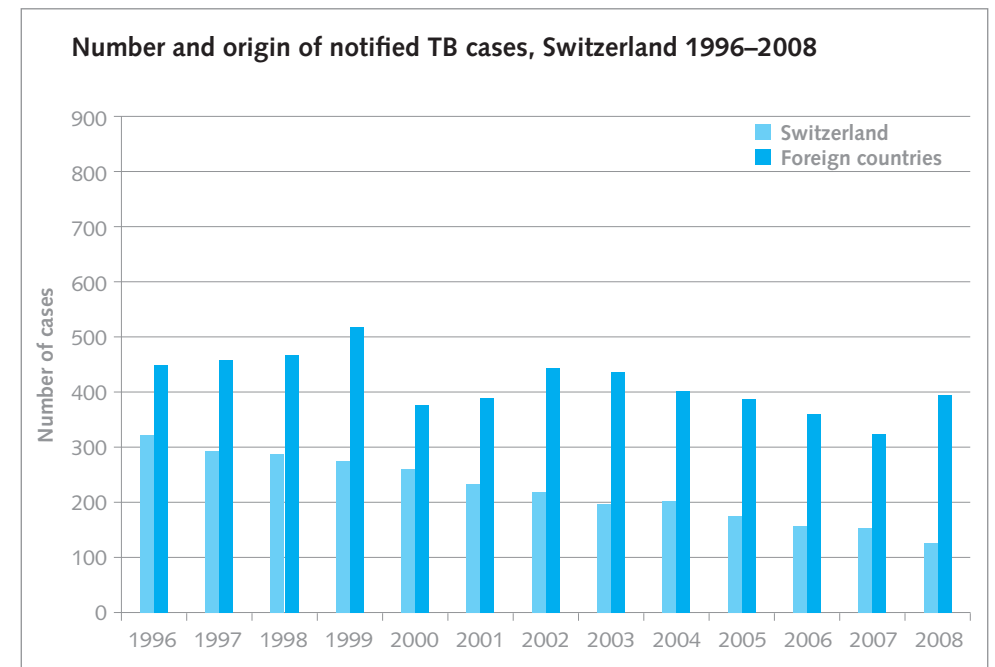
- to **“think TB”** in the presence of a patient with suspect symptoms, particularly if he/she belongs to a group with a high risk of tuberculosis (originating from a high-incidence country, contact with a case of infectious tuberculosis, immunodeficiency) (chap. 3);
- to rapidly carry out the necessary **diagnostic examinations** (chest X-ray, sputum analysis) or **refer** the patient to an experienced colleague or to a specialized centre (chap. 6);
- to **immediately notify** the local Health Department of any case of tuberculosis at the initiation of treatment (chap. 8);
- to ensure that the **close relatives (contacts) of a patient** with a transmissible form of tuberculosis are **examined**. The contact investigation is performed in cooperation with the local antituberculosis office designated by the Health Department, usually the local section of the Swiss Lung Association (chap. 5);
- to ensure that the patient **follows the prescribed treatment** until its scheduled termination, and to immediately notify the local Health Department of any interruptions, failure to comply with treatment or disappearance on the part of the patient (chap. 7);
- to **confirm that the case of tuberculosis has been cured** by performing the necessary examinations, or ordering the necessary examinations to be carried out of all infectious cases and informing the Health Department of the outcome of treatment (chap. 7).

# 2 Epidemiology

Tuberculosis has been on the decrease in Switzerland as in other western countries since the beginning of the 20th century. The total number of cases dropped to a minimum of 478 in 2007, then increased slightly over the following years. In 2009, out of 556 cases, 171 (31 %) involved Swiss citizens, 102 (18 %) Europeans, 154 (28 %) Africans, and 129 (23 %) persons from other parts of the world. Tuberculosis is located mainly in the lungs (72 %). Of the pulmonary cases, 30 % are diagnosed by positive microscopic examination of the sputum, and 83 % are confirmed by culture.

Foreign-born patients are mostly young adults, as is also the case in high-incidence countries.

Globally, WHO estimates that the incidence of tuberculosis is slowly decreasing, the total number of cases, however, is on the increase as a result of the growing world population. The rapid increase in the number of drug-resistant cases is a source of major concern [4].



## 3 Etiology, transmission and clinical presentation

### 3.1 Transmission

Tuberculosis is due to a mycobacterium belonging to the *Mycobacterium tuberculosis* complex, transmitted by aerial route (aerosol containing infectious particles) from patients with infectious forms of pulmonary disease (presence of living mycobacteria in the sputum). In healthy individuals, the inhalation of mycobacteria into the alveolae can induce a local inflammatory reaction and sensitization of the lymphocytes followed either by eradication of the mycobacteria or the formation of granulomas in the lung tissue and hilar and mediastinal lymph nodes.

Infected persons are not sick or contagious, and therefore cannot transmit the disease. The majority of them (estimated at around 90 %) will not develop tuberculosis. In such cases, the immune reaction is the only sign of a prior tuberculosis infection.

A minority (some 10 %) of persons exposed to and infected by tuberculosis will develop the disease, usually within two years following infection. The risk of progression from infection to disease is increased in very young age groups (infants and small children) and in any situation which decreases the quality of the immune defence mechanisms: HIV infection, immunodepressive treatment (particularly anti-TNF therapy), diabetes, smoking and malnutrition.

Only patients with tuberculosis of the airways (lungs, bronchi, larynx) can transmit the disease, if the expectorations contain large numbers of living mycobacteria and if the latter are dispersed into the environment as aerosols through coughing.

### 3.2 Localization

Tuberculosis is mostly located in the lungs (pulmonary tuberculosis) but can also affect other organs (extrapulmonary tuberculosis). The most frequent extrapulmonary localization is lymph node tuberculosis, followed by pleural, osteoarticular and urogenital tuberculosis. Disseminated forms (miliary tuberculosis, multiple involvement including the central nervous system) are mainly observed in immunodepressed patients (HIV, anti-TNF therapy) and in infants and small children.

### 3.3 Clinical presentation

Tuberculosis is clinically manifested as a slowly progressive infection with local (for pulmonary forms: cough, scanty sputum) and constitutional (fever, tiredness, night sweating, weight loss) symptoms. The symptoms are frequently mild during the early phase of the disease, and no clinical manifestation is specific of tuberculosis. Elderly patients usually have few symptoms. The clinical suspicion of tuberculosis therefore has to rely on a group of indicators such as the origin of the patient, duration of symptoms, prior exposure to the disease and radiological findings.

### 3.4 Radiological presentation

Abnormalities on chest X-ray are usually the most conspicuous sign of pulmonary tuberculosis. Unilateral infiltrates in the upper fields are highly suggestive of tuberculosis, particularly if they contain cavities or if a micronodular pattern is observed. Atypical localizations (infiltrates in the lower fields) can be present in elderly and immunodepressed patients. No radiological presentation is specific for tuberculosis. The radiological findings do not allow a distinction to be made between bacteriologically active, inactive or healed tuberculosis.

#### Real case No. 1

A 27-year-old non-smoking Cameroonian patient with a progressive cough for 3 months and a persisting infiltrate in the right upper lobe does not suffer from viral bronchitis.

#### Real case No. 2

A 14-year-old Angolan girl with 10 kg weight loss over the last 2 months and increasing cough on exertion suffers from more than adolescent depression.

## 4 Latent tuberculosis infection (LTBI)

In the majority of infected persons, tuberculous mycobacteria induce a delayed cellular immune reaction expressing the sensitization of T lymphocytes. The sensitization of T lymphocytes can be detected by:

- a tuberculin skin test (TST); or
- a blood test (interferon gamma release assay or IGRA).

Both tests assess the release of cytokines (interferon gamma) from sensitized T lymphocytes in the presence of mycobacterial antigens.

A positive response to either of these tests is indicative of a prior contact between the organism and the mycobacteria, but does not determine whether the mycobacteria are still present in an active or dormant state, or if they have been eradicated. Neither the TST nor the IGRA are adequate for determining or ruling out the presence of tuberculosis in the case of clinical or radiological suspicion. Furthermore, they cannot distinguish between latent infection (LTBI) and active disease.

The term **latent tuberculosis infection (LTBI)** only indicates the presence of this immune reaction. The risk of progression to tuberculosis is not covered by this term.

The risk assessment has to take the following into account (chap. 5):

- the age of the subject
- the duration since the exposure and/or the conversion of the reaction to positive (recent change or stable, long-term reaction)
- the quality of the immune defence

The risk of **progression to tuberculosis** after infection depends on the quality of the immune defence of the person exposed. Very young subjects (small children under 5 years), recently infected and immunodepressed persons (HIV, anti-TNF) are exposed to a high risk of progression to tuberculosis, and should be protected accordingly by a preventive drug treatment. This risk is highest during the first two years following infection, and decreases gradually thereafter.

### 4.1 Tuberculin skin test (TST)

The tuberculin used for this test contains a large number of mycobacterial peptides, most of which are also present in non-tuberculous mycobacteria (NTM) and in *M. bovis* BCG.

The TST is performed by the intradermal injection of 0.1 ml of PPD RT23 tuberculin (corresponding to 2 IU) on the volar surface of the forearm using a tuberculin syringe (1 ml) fitted with a short-bevel needle (26 G), and with the point facing upwards.

The reaction is analyzed at the very earliest 48 hours (preferably 72 hours) later. The result is based on the size in millimetres of the transverse diameter of the induration, without taking a possible erythema into consideration. An induration of 5 mm or more is considered as positive (possible tuberculosis infection).

However, the sensitivity and specificity of the TST are not totally satisfactory. The test is influenced by prior vaccination with BCG, contact with non-tuberculous mycobacteria or a prior tuberculin test (booster effect). In such cases, the TST may appear falsely positive (positive result without prior infection). Moreover, the reliability of the test decreases in elder and immunodepressed persons, and depends on the injection technique.

### 4.2 Blood tests (IGRAs)

The IGRAs [5] (two commercial tests are registered at Swissmedic) use only two (or three) peptides present in *M. tuberculosis* complex (without *M. bovis* BCG and *M. microti*), *M. marinum*, *M. kansasii* and *M. szulgai*. Their sensitivity is comparable to that of the TST, but their specificity is much higher. They assess the levels of interferon gamma released from the lymphocytes after incubation of a blood sample with specific peptides. The result is expressed in IU/ml (QuantiFERON-TB® Gold In-Tube) or in the number of sensitized lymphocytes/250,000 cells (T-SPOT®.TB). The technical instructions issued by the manufacturer must be carefully followed. In particular, the blood samples should not be exposed to the cold (inhibition of lymphocytes). The IGRA blood tests are not modified by prior vaccination with BCG. In infants and young children under 5 years, the proportion of indeterminate test results is increased. The place of IGRAs in infants and young children is still a matter of controversy.

### 4.3 Test indications

- For the detection of possible tuberculosis infection in persons recently exposed to a source case with infectious pulmonary tuberculosis (contact investigation)
- For the detection of possible tuberculosis infection in immunodepressed persons (initial check-up in persons with HIV infection, before immunodepressive treatment, for instance before anti-TNF therapy or organ transplantation)
- For the detection of possible tuberculosis infection in persons who are professionally exposed (healthcare workers, laboratory staff, social workers)

Immunological tests can also be an additional means of detecting tuberculosis infection in certain clinical situations in patients with suspect symptoms where the bacteriological confirmation of tuberculosis may be difficult or impossible to obtain (small children, immunodepressed patients, subjects with extrapulmonary tuberculosis).

### 4.4 Treatment options for LTBI

Persons with a LTBI and an increased risk of progression to tuberculosis should receive preventive treatment:

- isoniazid 5 mg/kg/d (10 mg/kg/d for pre-school children) (max. 300 mg) for 9 months; or
- rifampicin 10 mg/kg/d (max. 600 mg) for 4 months; or
- isoniazid and rifampicin for 3 months.

If correctly followed, LTBI treatment decreases the risk of progression to tuberculosis by about 90 %. Persons under LTBI treatment must be regularly followed to ensure their tolerance to treatment.

## 5 Contact investigations

The aim of contact investigations is to determine which person(s), among those in contact with an infectious case of pulmonary tuberculosis, may have been infected or may have already developed tuberculosis. For infected persons with an increased risk of progression to tuberculosis, this risk can be decreased by preventive treatment [6].

### The risk of infection depends on:

- the concentration of mycobacteria dispersed in the air through coughing by a patient with infectious pulmonary tuberculosis (index or source case),
- the proximity of contact and
- the duration of contact.

### The risk of progression to tuberculosis depends on:

- the age of the contact,
- the duration of the reaction (recent change or stable, long-term reaction) and
- the quality of the immune defence.

### The risk of tuberculosis transmission

Source cases whose expectorations or bronchial secretions collected by broncho-alveolar lavage (BAL) contain acid-fast mycobacteria visible at microscopic examination (S+) can transmit tuberculosis. It is assumed that a significant risk exists for contacts who have been **together** with the source case for **more than 8 hours** in the same **closed and unventilated room**.

Source cases whose expectorations or bronchial secretions collected by broncho-alveolar lavage (BAL) are determined as positive only by culture or by molecular amplification (for instance, PCR), but negative by direct microscopy (S-/C+), represent a lesser risk. In such cases, a significant risk exists for **close contacts** only, or if there is a total exposure time of **more than 40 hours**.

In Switzerland, the cantonal Health Departments are responsible for ensuring that the contact investigations are carried out. Contact investigations must be performed by well-trained, experienced staff (usually local sections of the Swiss Lung Association or Health Department members) in close cooperation with the treating physician.

### Indications for the initiation of a contact investigation:

- source case diagnosed as having pulmonary tuberculosis via microscopically determined positive sputum (S+) or BAL,
- source case diagnosed as having pulmonary tuberculosis via microscopically determined positive culture of sputum or BAL (C+), or by positive results of molecular amplification (contact investigation limited to close contacts and small children).

**Procedure**

**Firstly** a complete list of persons who were in close or prolonged contact with the source case during the 2 to 3 months before the diagnosis or the initiation of antituberculous therapy is prepared together with the patient.

If the patient lives in an institutional environment (hospital, nursing home, shelter or immigrant centre), the list is prepared with the help of a staff member from the institution. The list must be prepared as rapidly as possible (in the days immediately following notification and the initiation of treatment) so that the contact investigation can be planned taking into account the above-mentioned risk factors.

**Secondly** persons who were in close contact with the source case will be given a tuberculin skin test. In adults, a positive TST (5 mm or more) should be confirmed by a blood test (IGRA) (cf. algorithm). Only contacts with documented infection will require further examination (chest X-ray) to exclude the presence of active disease and assess the need for possible LTBI treatment. Children under 5 years of age will be clinically examined and receive a chest X-ray. However, the latter should not be performed before the TST or IGRA results are available.

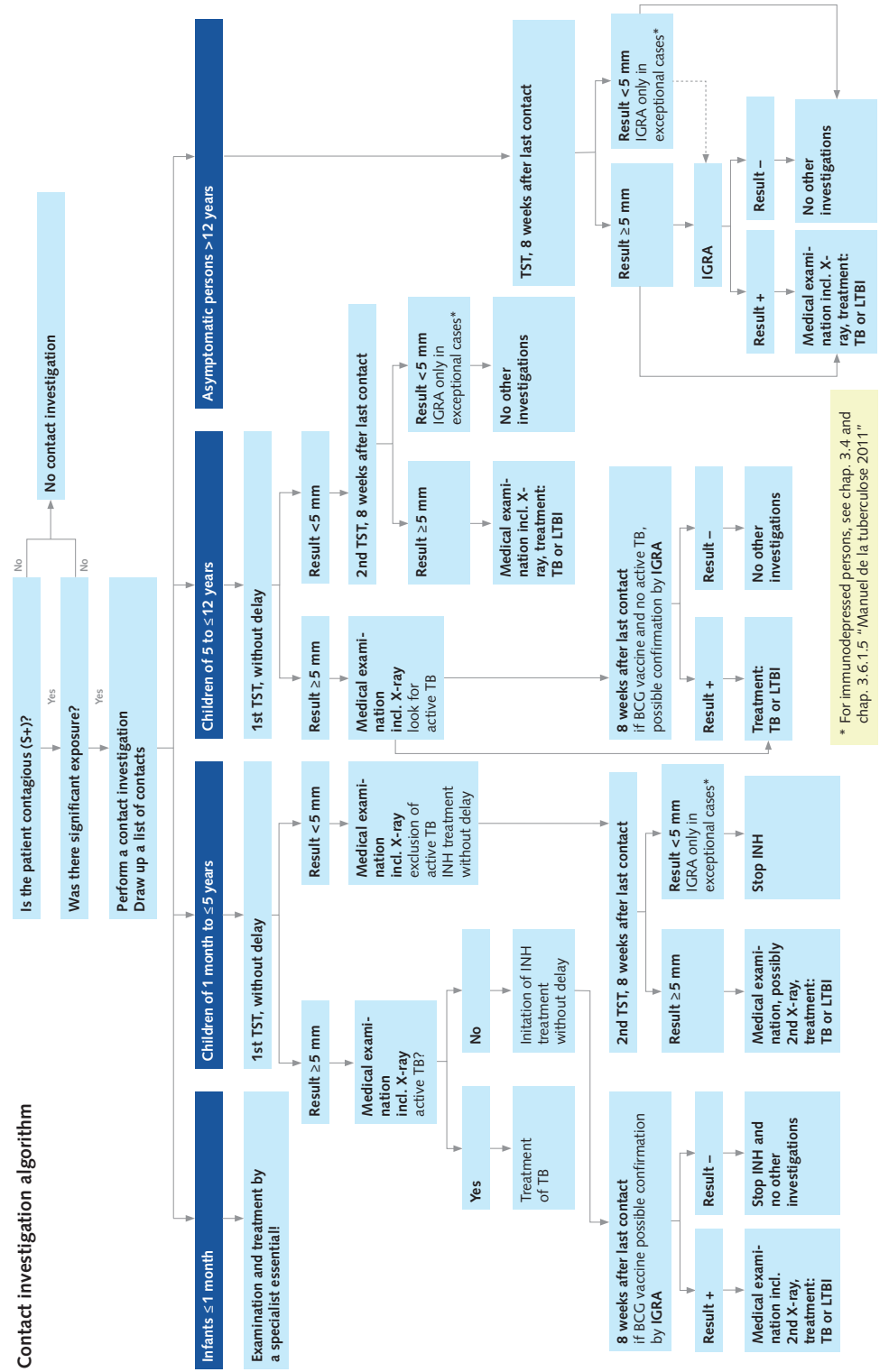
In practice, only those contacts with an infection detected by the TST or by the more specific IGRA are at risk of progression to tuberculosis. These persons must be clearly informed about the risk of developing the disease and about treatment for LTBI.

Contacts with a negative IGRA result more than 8 weeks after exposure have practically no risk of progression, unless they are immunodepressed subjects or are re-exposed to tuberculosis.

Among exposed contacts, independently of the intensity and duration of exposure, children under 12 years of age and immunodepressed persons must be tested without delay. Contacts who show possible symptoms of tuberculosis must have a medical examination as rapidly as possible. All other contacts should be examined 8 weeks after the last contact with the source case.

In some cantons, contacts from 12 years of age are tested with the IGRA only. This alternative procedure is acceptable.

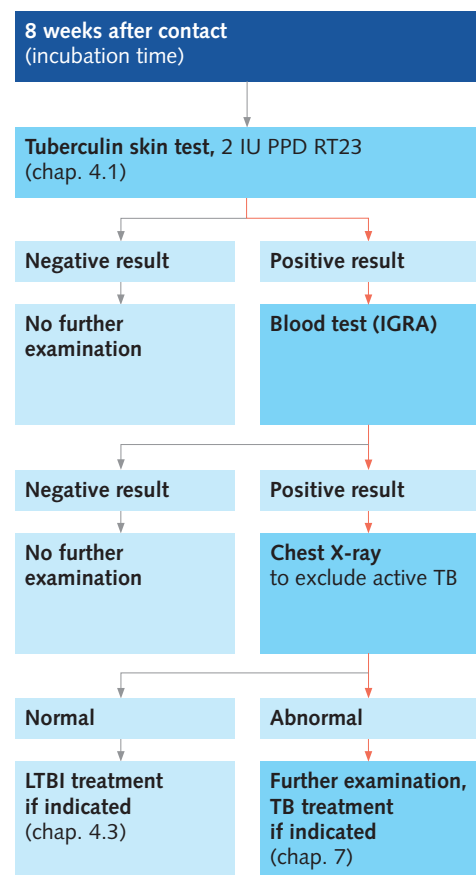
**Contact investigation algorithm**



\* For immunodepressed persons, see chap. 3.4 and chap. 3.6.1.5 "Manuel de la tuberculose 2011"

**Procedure for the contact investigation**

The first test is performed 8 weeks after the last contact with the source case for contacts over 12 years of age.

**Exceptions****Children under 12 years of age**

- Immediate testing
- Children with a negative first test are given another test 8 weeks later.

**Children under 5 years of age**

Immediate medical examination including chest X-ray. Children under 5 years of age with a negative first test and without active TB should receive isoniazid treatment, and have another test 8 weeks later. If the second test is negative, the treatment may be interrupted. If the second test is positive (conversion), the children should be re-examined and the LTBI treatment should be continued for 9 months in total after exclusion of an active TB.

**Newborns up to 1 month of age**

Must be examined by a specialist.

**Immunodeficient persons**

Immunodeficient persons (HIV infection, drug-induced immunodepression, transplantation, severe renal failure, etc.), should be given an immediate test (TST and/or preferably IGRA). If the result is negative, the test should be repeated 8 weeks later. If the second test is positive, the presence of active TB should be excluded (by clinical and radiological examination) before prescribing LTBI treatment.

## 6 Diagnosis of tuberculosis

The diagnosis of tuberculosis is based on the identification of mycobacteria from the *M. tuberculosis* complex in a biological sample (sputum, BAL, pleural fluid, biopsy) taken from a patient (confirmed case).

Cases of tuberculosis diagnosed on the basis of symptoms, clinical signs or radiological abnormalities are considered as unconfirmed or suspected cases.

Immunological tests (TST and IGRAs) are indirect tests for determining the presence of tuberculous infection, but are not proof of the disease.

In cases with a clinical or radiological suspicion of tuberculosis, it is important to take **two sputum samples**, one of which should be collected in the morning before eating. Sputum induction with an aerosol containing 3 % hypertonic saline (with salbutamol) can frequently replace bronchoscopy, and is also appropriate for children of school age. However, for small children, the examination of gastric fluid collected by gastric lavage remains the method of choice.

The microscopic examination of stained sputum smears is a rapid means of assessing the infectious state of the patient, the need for isolation and the extent of contact investigation, but has low sensitivity and does not rule out the presence of tuberculosis. It must be completed by sample culture on solid and liquid media to demonstrate the presence of tuberculosis mycobacteria.

In cases with a high clinical suspicion of tuberculosis but direct microscopic determination that shows negative results, genetic amplification (by PCR or a similar technique) can be used for the more rapid detection of mycobacteria of MTB-complex.

In cases with a high suspicion of drug resistance (incomplete prior treatment, relapse after complete treatment, contact with cases of known drug resistance, patient originating from a region with a high rate of drug resistance according to WHO reports), rapid genotypic testing for drug resistance is mandatory.

All positive cultures must be completed by phenotypic determination of drug resistance to the first-line antituberculous drugs (isoniazid, rifampicin, ethambutol and pyrazinamide).

## 7 Treatment of tuberculosis

### 7.1 Standard treatment schedule

Before initiating antituberculous treatment, it is essential to:

- confirm the diagnosis by appropriate bacteriological examinations whenever possible (culture of two specimens);
- assess the risk of drug resistance, in particular against isoniazid and rifampicin (= MDR-TB);
- assess the immunological status of the patient (HIV test).

Tuberculosis is treated by an association of antituberculous drugs administered over a period of several months [2].

#### Standard treatment of tuberculosis for adults (for children, see chap. 7.3):

##### Initial or intensive phase:

4 drugs: isoniazid (H) 5 mg/kg, rifampicin (R) 10 mg/kg, pyrazinamide (Z) 25 mg/kg and ethambutol (E) 15 mg/kg for 2 months, followed by

##### Continuation phase:

2 drugs: isoniazid (H) 5 mg/kg, rifampicin (R) 10 mg/kg, for 4 months.

##### Abridged designation: 2HRZE/4HR.

All antituberculous drugs are administered once daily, if possible in the morning before eating in order to ensure high blood levels. To simplify the administration of treatment, the use of combined preparations is recommended.

All forms of tuberculosis are treated according to the same standard schedule except for the following:

- TB meningitis, where the continuation phase is extended to 10 months, with or without the addition of steroids during the first few weeks
- TB due to mycobacteria which are resistant to one or more of the standard treatment drugs.

### 7.2 Treatment of drug-resistant forms

Inappropriate treatment of patients with drug-resistant mycobacteria can lead to the development of further resistance. The risk of drug resistance is particularly present in patients who:

- have received prior antituberculous drug treatment for one month or more. The risk is particularly high if the treatment was administered for several months without success (treatment failure), or if the treatment schedule did not correspond to current recommendations;
- have been in contact with a patient with known drug resistance;
- are from a region with a high rate of drug resistance (see WHO report: WHO/HTM/TB/2010.3).

In the case of a high suspicion or demonstration of drug resistance, the treatment schedule has to be adapted to the sensitivity of the mycobacteria, if necessary by adding reserve or second-line drugs. The advice of a specialist is recommended.

#### Treatment schedule for TB in the case of resistance to isoniazid alone:

- treatment for 6 months with an association of rifampicin, ethambutol and pyrazinamide (6REZ); or
- isoniazid, rifampicin, pyrazinamide and ethambutol for 2 months, followed by an association of isoniazid, rifampicin and ethambutol for 4 months (2HRZE/4HRE).

#### Treatment schedule for TB in the case of resistance to isoniazid and rifampicin (multidrug-resistant TB = MDR-TB):

An association of 5 active drugs for 6 months (ethambutol, pyrazinamide, quinolone, 1 injectable, 1 reserve drug), followed by 3–4 oral drugs for 18 months [7].

### 7.3 Special situations

**Children:** The treatment schedule for tuberculosis in children is the same as for adults, but the dose of isoniazid must be adapted in pre-school children to 10 mg/kg/day (max. 300 mg/day). The treatment of TB meningitis may require the addition of an injectable drug and should be supervised by a specialist.

**Pregnancy and breast-feeding:** The standard treatment schedule (2HRZE/4HR) can be followed.

**Immunodepression:** The standard treatment schedule can be followed, but possible interactions between rifampicin and certain antiretrovirals should be taken into account.

**Hepatic failure:** In the case of severe hepatic failure, pyrazinamide has to be replaced by non-hepatotoxic drugs such as streptomycin, amikacin, ethambutol or a quinolone.

### 7.4 Treatment follow-up

**Direct observation of drug intake:** Both at the initiation of therapy and during the treatment period, it is important to assess with each patient how reliable he/she will be in taking the prescribed drugs each day. In order to ensure regular intake, the WHO recommends the supervision of drug administration by a third person (directly observed treatment: DOT) and the use of combined preparations. Direct supervision and the use of fixed combinations limit the risk of failure and the development of drug resistance during treatment. For these reasons, direct supervision is recommended in certain situations, in particular:

- if there are problems of communication with the patient (immigrants, elderly patients, patients with psychiatric disorders)
- for patients who are socially (homeless individuals, refugees without fixed accommodation) or individually (persons dependent on alcohol or illicit drugs, children and adolescents) unstable
- in cases of renewed treatment for tuberculosis or treatment for drug-resistant tuberculosis, particularly MDR-TB.

**Clinical follow-up during treatment:** So that possible adverse events can be rapidly detected and to ensure patient compliance with treatment, the organization of regular clinical visits is recommended: **Every other week during the initial intensive phase of treatment, then once a month until the termination of treatment.**

**Adverse effects of treatment:** Adverse effects of antituberculous drug treatment are frequently observed in adults and mainly consist of gastrointestinal (gastralgia, nausea), hepatic (increase in transaminase levels, drug-induced hepatitis), neurological (dizziness, fatigue, paresthesia, visual disturbances) and dermatological (itching, erythema) disorders. Minor adverse events can be treated with appropriate drugs, but in the case of severe events (such as drug-induced hepatitis) the temporary interruption of treatment is necessary, with the subsequent replacement of the drugs used by less toxic drugs. The advice of a specialist is recommended. In children, adverse effects of drug treatment are an extremely rare occurrence.

**Examination of the sputum during treatment:** The effect of treatment and the possible development of drug resistance can be assessed by regular follow-up of all patients with initially culture-positive pulmonary tuberculosis. Examination of the expectorations (spontaneous or induced) by direct microscopic examination and culture is therefore recommended:  
– at the end of the intensive phase (end of the second month); and

– before the end of the continuation phase (end of the fifth month).

**Radiographic follow-up:** Chest X-ray may be useful for indirectly assessing the effect of antituberculous treatment, but is not obligatory. However, chest X-ray should be performed in the following situations:  
– before the initiation of treatment;  
– at the end of the initial intensive phase (end of the second month); and  
– at the termination of treatment (end of the sixth month).

## 7.5 Isolation of patients with tuberculosis

The aim of isolating patients during the contagious period – in hospital, or in exceptional circumstances at home (if the patient's physical condition permits, and he/she lives in a sound psychosocial environment) – is to prevent the transmission of tuberculous mycobacteria to third persons and protect the public from a source of infection.

**The patient may be allowed out of isolation if all the following conditions are met:**

- The drugs have been taken under supervision for at least 2 weeks, the treatment is well tolerated
- Patient compliance is guaranteed (if necessary, further supervision of drug intake should be organized)
- Cough is absent or rare

- A positive clinical response to treatment is observed
- There is no suspicion or proof of drug resistance (patient originating from or visiting a high-risk country or who is exposed to a high-risk setting, prior antituberculous treatment)
- Continuation of treatment is assured, and there are no medical, social or administrative obstacles

## 7.6 Outcome of antituberculous treatment

The outcome of treatment must be assessed according to the pre-defined categories determined by the WHO:

- 1. Cure**  
Full treatment course with the documentation of negative culture in cases with culture-positive pulmonary tuberculosis.
- 2. Treatment completed**  
Treatment has been completed without the documentation of negative culture (culture-negative cases or no documentation).
- 3. Default/Failure to comply with treatment**  
Interruption of treatment for two consecutive months or more.
- 4. Treatment failure**  
Persistence of positive cultures after 5 months of treatment or even later.
- 5. Death due to tuberculosis**  
Death due to tuberculosis before or during antituberculous treatment.

### 6. Death due to another reason

Death due to a reason other than tuberculosis, before or during antituberculous treatment.

### 7. Transfer out

Patients transferred to another treatment facility and for whom the outcome is not known.

### 8. Other

For instance, treatment continuation in the case of MDR-TB.

### Real case No. 3

An elderly patient with drug-sensitive tuberculosis conscientiously follows his treatment schedule, but still coughs after several weeks of treatment. The doctor then realizes that every morning the patient takes only one pill daily instead of four, because the prescription did not mention the daily dose!

The main cause of failure, relapse or drug resistance is an error in the treatment schedule (the drug dosage is too low; the treatment is incomplete, too short, or intermittent) or a communication problem between the patient, the doctor, the laboratory, the pharmacist or the nursing staff.

## 8 Notification and epidemiological surveillance

Notification of a case of tuberculosis is mandatory (Law on Epidemics). The Health Officer of the canton where the patient is resident or is staying must be notified:

- **by the medical physician** for any case of tuberculosis for which antituberculous treatment has been initiated with at least 3 drugs. The following forms are to be completed: the **Initial notification** (within one week) and the **Complementary notification of tuberculosis** ([www.tbinfo.ch](http://www.tbinfo.ch) > formulaires > formulaires de déclaration TB). For patients with positive cultures but for whom treatment was not initiated (due to death or loss to follow-up) the notification is also required;
- **by the laboratory** in the case of identification of mycobacteria of the *M. tuberculosis* complex by positive culture and/or sputum microscopy. A copy of the form **Initial laboratory notification** must be sent directly to the Swiss Federal Office of Public Health (SFOPH).

The cantonal Health Officer checks the information contained in the notification forms and transmits them to the SFOPH. He/She then decides whether or not to carry out a contact investigation. Contact investigations and registration of the outcome of treatment are usually performed by the local section of the Swiss Lung Association.

### Real case No. 4

The cantonal Health Officer cannot initiate a contact investigation if the medical physician has forgotten to notify the Health Department about the case of tuberculosis! The medical declaration should always be made before (and not after) notification by the laboratory of a positive culture.

## 9 Vaccination with BCG

Vaccination with BCG is no longer indicated for children and adults living in Switzerland. However, it is still recommended for newborns and infants under 1 year if there is a probability that they will be living in a country with a high prevalence of tuberculosis. In such a case, the BCG vaccination decreases the risk of developing a disseminated form of tuberculosis (miliary TB, meningitis) and of dying from the disease.

## 10 Tuberculosis among migrants in Switzerland

The majority of cases of tuberculosis in Switzerland are observed among persons who were born in a foreign country. Asylum seekers are currently the only population group for whom active screening (based on history and symptoms) for tuberculosis is performed at the border when they claim for asylum. Each year, this screening detects a certain number of cases of tuberculosis. However, the majority of cases of tuberculosis will not be discovered until after entry into the country, by progression of the disease from a symptom-free stage or by the reactivation of a latent infection. It is therefore important to remain particularly vigilant, to bear in mind the possibility of tuberculosis in any person of foreign origin with suspect symptoms, and to rapidly carry out a chest X-ray followed by a bacteriological examination of the sputum in the case of any radiological abnormality. Access to medical care must be guaranteed for any patient suspected of having the disease or with a positive diagnosis of tuberculosis, whatever his or her legal status. In principle, patients with tuberculosis who have entered the country as asylum seekers have the right to complete their treatment in Switzerland (chap. 11.6.1).

### Real case No. 5

A young Senegalese who coughs up blood every morning for 10 days is suffering from more than a nosebleed!

## 11 Financial issues and legal background

In Switzerland, the Federal Law on Epidemics of 1970 and the Federal Law of 1928 on the fight against tuberculosis [8, 9] constitute the legal basis for the anti-tuberculosis campaign. The Health Insurance Law (LAMal) with its Ordinance (OAMal) and the Federal Law on Accident Insurance (LAA) [10–12] govern the financing of the fight against tuberculosis.

Depending on the individual circumstance and the services provided, 5 distinct bodies can be differentiated which are responsible for assuming the costs involved:

- the health insurance
- the accident insurance
- the cantonal Public Health Department
- the employer
- the individual(s) involved

Particular attention should also be paid to the issue of which body should bear the costs regarding asylum seekers, or persons who do not have a valid residence permit and in the event of directly supervised treatment (chap. 11.6).

### 11.1 Health insurance

As a rule, after the detection of a latent tuberculous infection (LTBI), the health insurer is responsible for assuming the costs connected with complementary medical investigations (for the exclusion of tuberculosis), as well as the costs of treatment to the extent that the disease is not considered a professional illness (chap. 11.2). When tuberculosis has been diagnosed, the health insurer assumes the cost of the investigations and treatment involved [10,12,13]. The person concerned is obliged to participate in the

associated cost (annual deductible and percentage participation), and there is no exception to this rule.

### 11.2 Accident insurance

Accident insurance is competent in matters pertaining to professional illness. Article 9 of the LAA [11] defines what is considered as professional illness, and summarizes this in Annexe 1 of the Ordinance on Accident Insurance (OLAA) [14]. In fact, it is necessary to determine whether or not the illness concerns an infection or a disease contracted in a public health institution or in another institution (which is not part of the public health system).

If it appears that professional activity is most likely at the origin of an infection or a disease (for example TST or IGRA conversion, or the development of active tuberculosis after contact with a contagious source case within the institution in question), this has to be declared to the accident insurer as a well-founded suspicion of contagion or a disease caused by a professional activity. The accident insurer will then clarify the case and determine whether it involves a professional illness as defined in the clauses of the first or second paragraph of article 9 (LAA).

If the accident insurer recognizes the validity of the professional illness, the cost of the medical investigations and treatment of active tuberculosis will be assumed by the aforementioned body. The same applies for medical investigations connected with LTBI as well as the treatment thereof, on condition however that the disease is in fact a result of the exposure in question (for example, test conversion) [15].

### 11.3 Public Health Authorities

As defined in the provisions of the Law on Epidemics, control investigations (CI) are epidemiological investigations and come under the responsibility of the cantonal public health authorities. Therefore, the cantonal Public Health Department in principle assumes the cost of the control investigations it orders to be carried out following a declared case of contagious tuberculosis, but the aforementioned law does not contain any explicit provisions obliging the cantons to undertake such financing. This is why it is recommended in all instances not to proceed with contact investigations until instructed to do so by the cantonal public health office.

### 11.4 Employers

In the public health institutions and in certain institutions that are not part of the public health system (chap. 11.2) but which carry out preventive examinations when an employee enters into service or repeat these examinations regularly, the employer shall assume the cost of these preventive measures.

### 11.5 Private persons

Those individuals who request a screening test for LTBI for private reasons or who need this result before they can be admitted to a certain school must as a general rule assume these costs in full.

### 11.6 Special situations

#### 11.6.1 Tuberculosis in asylum seekers

When tuberculosis has been diagnosed in an asylum seeker, the Federal Office for Migration (FOM) has to assume the cost of screening and treatment, or take out a health insurance. The diagnosis has no influence whatsoever on the decision that the authority dealing with asylum issues will subsequently decide to take. It has been agreed upon between the Federal Office of Public Health (FOPH) and the FOM that an asylum seeker who suffers from tuberculosis may stay in Switzerland until the termination of his or her treatment. As a result, the implementation of possible measures to send back the asylum seeker or expel him/her from the country is postponed until the treatment has been terminated. This rule also applies to asylum seekers for whom the FOM has submitted a request for admission to a country of the European Union under the terms of the Dublin Convention. However, this rule does not apply to persons with latent tuberculous infections. The physician who has made the diagnosis of tuberculosis or who is treating the disease should send the “Medical Report” form ([www.bfm.admin.ch/content/bfm/fr/home/dokumentation/downloads.html](http://www.bfm.admin.ch/content/bfm/fr/home/dokumentation/downloads.html)) to the FOM, because this document constitutes the *sine qua non* condition for obtaining a suspensive measure in favour of treatment. However, in the event of a DNEM, a negative decision previously handed down regarding the demand for asylum, following which the person has stayed on illegally in our country, his or her legal status is comparable to that of an illegal immigrant. In this instance, the legislation currently in force does not oblige the FOM to assume the above-mentioned costs.

### 11.6.2 Persons who reside illegally in our country

According to the terms of the provisions laid down in article 3, paragraph 1 of the LAMal, any person residing in Switzerland must take out a health insurance within three months of taking up residence in the country, or a health insurance must be taken out within three months for a baby born in Switzerland. As a result, even people without a valid residence permit (illegal immigrants) who stay on in our country as defined in the provisions of article 24 CC [16] have to take out this compulsory health insurance, as stipulated in the LAMal. This is the reason why health insurers are obliged to insure the persons who request this and who meet the above-mentioned conditions regarding residence. This request can also be presented after declaration of the disease, with retroactive effect (articles 7 [paragraph 8] and 8 of the OAMal). In pursuance of the provisions of article 12 of the Federal Constitution (Cst) [17], a constitutional right to assistance exists. In fact, whoever finds himself/herself in a situation of distress and is not capable of looking after himself/herself has the right to be aided and assisted and to receive the means necessary to lead an existence that is in keeping with human dignity. This right also applies to illegal immigrants. "The national platform for the medical treatment of illegal immigrants" provides more extensive information on the subject of health prevention for illegal immigrants ([www.tbinfo.ch](http://www.tbinfo.ch) > [adresses utiles](#) > [sans-papiers](#)).

### 11.6.3 Directly supervised treatment (DOT)

In certain circumstances, DOT may be indicated (chap 7.4). As a general rule, the health supervisor (HS) is instructed by the canton to carry out a

DOT. However, the administration *per se* of the treatment drugs may be delegated to another body (for example, a pharmacy, the cantonal centre for asylum seekers, the social services, or the treating physician). The HS charges the canton for the time spent on administrative tasks according to the instructions given in a service order, but only to the extent that this aspect is included in the aforementioned service order. For the provision of services by the body administering the treatment drug to the patient (i.e. the HS or delegated body), there are the two following invoicing possibilities:

1. The HS's services are invoiced to the canton. In the event that an amount due has been agreed upon between the HS and the body that administers the drugs, this payment is generally invoiced to the canton.
2. The service is invoiced to the patient for the attention of the health insurance concerned. However, this is only possible if the body that administers the drugs is a medical physician or a recognized service provider as laid down in the provisions of the LAMal (nursing staff and auxiliary personnel and organizations providing their services upon medical prescription, cf. articles 49 and 51 of the OAMal). As regards the administration of drugs by non-medical personnel, the Tarmed schedule of medical fees 00.0150 can be used. However, the patient must participate in the cost of treatment through a deductible and by-percentage participation (self-contribution).

## 12 Information and useful addresses

### 12.1 Brochures/Printed matter

A list of the publications available at the Tuberculosis Competence Centre is given below ([www.tbinfo.ch](http://www.tbinfo.ch) > Publications):

#### For health professionals

- The "Manuel de la tuberculose" F/G/I (available in PDF only)
- Abridged version of the "Manuel de la tuberculose" (F/G/I/E)
- "Tuberculosis: Risks and Prevention at the Workplace" (brochure No. 2869/35, SuvaPro)
- Scales for reading the skin test

#### For the general public

- Information brochures on tuberculosis (F/G/I) (also available in PDF)
- Handbook on tuberculosis in 16 languages (also available in PDF)
- Information sheet on tuberculosis in 10 languages, entitled "Frequently-asked Questions about Tuberculosis and their Answers" (available in PDF only)

### 12.2 The Internet

On the Internet site [www.tbinfo.ch](http://www.tbinfo.ch) you can find the following continuously updated information:

#### List of addresses

- [www.tbinfo.ch](http://www.tbinfo.ch) > [Adresses utiles](#)
- Cantonal services specialized in tuberculosis
  - Persons to contact for the supracantonal contact investigations

- Persons to contact at the Confederation reception centres
- List of addresses of the cantonal physicians
- Community interpreters
- Unit for health consultations and for providing assistance to illegal immigrants
- Units for tuberculosis in the countries of the European Union
- Laboratories that carry out IGRA tests
- List of antituberculosis drugs available in Switzerland

#### Other services provided

- [www.tbinfo.ch](http://www.tbinfo.ch) > [Prestations](#)
- Answers to frequently asked questions (question forum)
  - Offers of further training programmes
  - Presentations made at recent tuberculosis symposia
  - Databank of reference works
  - Databank of iconographic data
  - Films
  - Statistics
  - Collection of links on the Internet focusing on the theme of tuberculosis

### 12.3 TB-hotline for medical staff

At telephone no. **0800 388 388**, experts reply to questions asked by medical staff regarding the treatment of tuberculosis. This information is provided in French, German or Italian from Monday to Friday from 8 a.m. to 12 a.m. and from 2 p.m. to 5 p.m.

### Essential references

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2. World Health Organization. Treatment of Tuberculosis. Guidelines. 4th edition. Geneva: World Health Organization 2009, www.WHO/HTM/TB/2009.420.
3. Tuberculosis Coalition for Technical Assistance. International Standards for Tuberculosis Care (ISTC). 2nd edition. The Hague 2009, www.istcweb.org.
4. World Health Organization STBD. Global Tuberculosis Control. WHO Report 2010, www.WHO/HTM/TB/2010.7.
5. Diel R, Goletti D, Ferrara G, Bothamley G, Cirillo D, Kampmann B, et al. Interferon-(gamma) release assays for the diagnosis of latent Mycobacterium tuberculosis infection: a systematic review and meta-analysis. *Eur Respir J.* 2011 Jan; 37(1):88–99.
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8. Loi fédérale du 18 décembre 1970 (état le 1<sup>er</sup> août 2008) sur la lutte contre les maladies transmissibles de l'homme (Loi sur les épidémies) (LEp) (RS 818.101).
9. Loi fédérale du 13 juin 1928 sur la lutte contre la tuberculose (état le 13 juin 2006) (RS 818.102).
10. Loi fédérale du 18 mars 1994 (état le 1<sup>er</sup> janvier 2010) sur l'assurance-maladie (LAMal) (RS 832.10).
11. Loi fédérale du 20 mars 1981 (état le 1<sup>er</sup> juin 2009) sur l'assurance-accidents (LAA) (RS 832.20).
12. Ordonnance du 27 juin 1995 (état le 1<sup>er</sup> janvier 2010) sur l'assurance-maladie (OAMal) (RS 832.102).
13. Ordonnance du DFI du 29 septembre 1995 (état le 1<sup>er</sup> août 2010) sur les prestations dans l'assurance obligatoire des soins en cas de maladie (Ordonnance sur les prestations de l'assurance des soins [OPAS]) (RS 832.112.31).
14. Ordonnance du 20 décembre 1982 (état le 1<sup>er</sup> janvier 2008) sur l'assurance-accidents (OLAA) (SR 832.202).
15. Jost M, Merz B, Rügger M, Zellweger JP, Shang Meier H, Cartier B, Käslin E. Tuberculose dans le cadre professionnel risques et prévention. 3<sup>e</sup> édition 2010. Editions SuvaPro.
16. Code civil suisse du 10 décembre 1907 (état le 1<sup>er</sup> février 2010) (RS 210).
17. Constitution fédérale de la Confédération suisse du 18 avril 1999 (état le 7 mars 2010) (RS 101).

## Specialized services for tuberculosis

### Aargau/Basel-Land

Tel. 062 832 40 00  
lungenliga.aargau@llag.ch  
www.lungenliga-ag.ch

### Basel-Stadt

Tel. 061 267 95 26  
gsd@bs.ch  
www.gesundheitsdienste.bs.ch

### Bern

Tel. 031 300 26 26  
info@lungenliga-be.ch  
www.lungenliga-be.ch

### Fribourg

Tél. 026 426 02 70  
info@liguepulmonaire-fr.ch  
www.liguepulmonaire-fr.ch

### Genève

Tél. 022 372 95 48  
cat.infirmieres@hugce.ch  
www.hug-ge.ch

### Glarus

Tel. 055 640 50 15  
lungenligaglarus@bluewin.ch  
www.lungenliga-gl.ch

### Graubünden

Tel. 081 354 91 00  
info@llgr.ch  
www.llgr.ch

### Jura

Tél. 032 422 20 12  
direction@liguepj.ch  
www.liguepulmonaire.ch

### Luzern-Zug/ Nidwalden/Obwalden

Tel. 041 429 31 10  
info@lungenliga-lu-zg.ch  
www.lungenliga-lu-zg.ch

### Neuchâtel

Tél. 032 723 08 68  
ligue.pulmonaire@ne.ch  
www.liguepulmonaire.ch

### St. Gallen/ Appenzell AI/Appenzell AR

Tel. 071 228 47 47  
info@lungenliga-sg.ch  
www.lungenliga-sg.ch

### Schaffhausen

Tel. 052 625 28 03  
info@lungenliga-sh.ch  
www.lungenliga-sh.ch

### Schwyz

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www.lungenliga-schwyz.ch

### Solothurn

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www.lungenliga-so.ch

### Thurgau

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www.lungenliga-tg.ch

### Ticino

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legapolm@bluewin.ch  
www.legapolmonare.ch

### Uri

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lungenliga.uri@bluewin.ch  
www.lungenliga-uri.ch

### Valais

Tél. 027 329 04 29  
info@lvpp.ch  
www.liguepulmonaire.ch

### Vaud

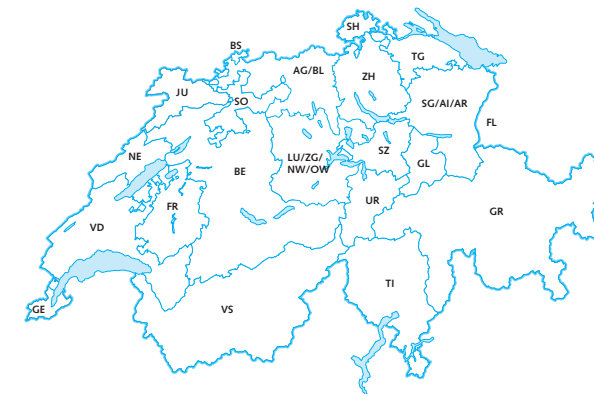
Tél. 021 623 37 47  
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www.liguepulmonaire.ch

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info@lunge-zuerich.ch  
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