ЗМІСТ

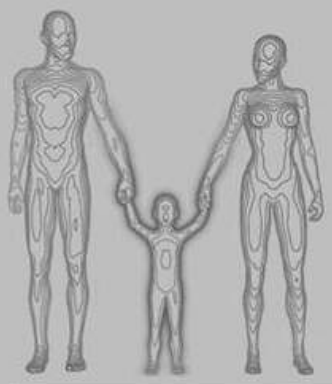
# Family Medicine: in 3 books. Book 3. Special Part. Multidisciplinary General Medical Practice: textbook

# Про книгу

The textbook is committed to provide current information regarding family physician practice, considering the multidisciplinary aspect of general medical practice. The textbook contains practical recommendations for family physicians in the management of patients with nosologies at the stage of primary medical care, focuses on the clinical manifestations, diagnostic criteria, treatment and prevention algorithms within the occupational competence framework of family physician, as well as the guidelines for interaction with healthcare professionals who provide specialized care.

The textbook corresponds to the curriculum on the specialty «General Practice/Family Medicine» and is intended for use by students of higher medical educational establishments, internship doctors, family physicians/GPs and pediatricians.

# FAMILY MEDICINE



IN 3 BOOKS

Edited by
Professor **O.M. HYRINA,**
Professor **L.M. PASIYESHVILI,**
Professor **L.S. BABINETS**

BOOK 3

## SPECIAL PART. MULTIDISCIPLINARY GENERAL MEDICAL PRACTICE

APPROVED
by the Ministry of Education and Science of Ukraine as a textbook for students of higher medical educational establishments

PUBLISHED
in accordance with the Order of the Ministry of Health of Ukraine No. 502 of 22 June 2010 as a national textbook for students of higher medical educational establishments

RECOMMENDED
by the Academic Council of Bogomolets National Medical University to be published as a textbook «Family Medicine» in three books, edited by Professor O.M. Hyrina, Professor L.M. Pasiyeshvili

**Kyiv**
**AUS Medicine Publishing**
**2020**

UDC 616.1/4;616.6
LBC 51.1 (4 ENG) 2ya73
F42

*Approved by the Ministry of Education and Science of Ukraine as a textbook for students of higher medical educational establishments (letter No. 124 of 17 December 2012)*

*Published in accordance with the Order of the Ministry of Health of Ukraine No. 502 of 22 June 2010 as a national textbook for students of higher medical educational establishments*

*Recommended by the Academic Council of Bogomolets National Medical University to be published as a textbook «Family Medicine» in three books, edited by Professor O.M. Hyrina, Professor L.M. Pasiyeshvili (minutes No. 2 of 9 November 2010)*

**Authors:**

*L.S. Babinets, P.A. Bezditko, S.A. Bondar, V.I. Velychko, Ya.I. Venher, O.O. Vorontsov, I.A. Harahatyi, N.M. Zhelezniakova, A.A. Zazdravnov, V.H. Karpenko, V.S. Konoplitskyi, V.I. Korostii, V.M. Lisovyi, B.O. Mihenko, A.A. Nalizhytyi, N.M. Pasiyeshvili, T.M. Pasiyeshvili, S.M. Pukhlyk, T.I. Tamm, O.L. Tovazhnianska, T.V. Frolova, O.S. Shevchenko, V.M. Zhdan, M.Yu. Babanina, N.S. Shnayder, H.O. Danylchuk*

**Reviewers:**

*L.F. Matiukha* — Doctor of Medical Sciences, Professor, Head of the Department of Family Medicine and Outpatient Care of Shupyk National Medical Academy of Postgraduate Education;
*O.M. Korzh* — Doctor of Medical Sciences, Professor, Head of the Department of General Practice — Family Medicine of Kharkiv Medical Academy of Postgraduate Education

**English language editor:**

*I.V. Rozhenko*, Ukrainian Medical Stomatological Academy

**Family** Medicine : textbook : in 3 books. Book 3. Special Part. Multidisciplinary
F42 General Medical Practice / L.S. Babinets, P.A. Bezditko, S.A. Bondar et al. ; edited by O.M. Hyrina, L.M. Pasiyeshvili, L.S. Babinets. — Kyiv : AUS Medicine Publishing, 2020. — 616 p. + 14 p. colour insert.
ISBN 978-617-505-493-2 (edition in 3 books)
ISBN 978-617-505-799-5 (book 3)

The textbook is committed to provide current information regarding family physician practice, considering the multidisciplinary aspect of general medical practice. The textbook contains practical recommendations for family physicians in the management of patients with nosologies at the stage of primary medical care, focuses on the clinical manifestations, diagnostic criteria, treatment and prevention algorithms within the occupational competence framework of family physician, as well as the guidelines for interaction with healthcare professionals who provide specialized care.

The textbook corresponds to the curriculum on the specialty «General Practice/Family Medicine» and is intended for use by students of higher medical educational establishments, internship doctors, family physicians/GPs and pediatricians.

**UDC 616.1/4;616.6**
**LBC 51.1(4 ENG)2ya73**



ISBN 978-617-505-493-2 (edition in 3 books)
ISBN 978-617-505-799-5 (book 3)

# Contents

Chapter 12

# PHTHISIOLOGY

Tuberculosis, also historically known as consumption, wasting disease, and the white plague, is a severe infectious disease, caused by *Mycobacterium tuberculosis*, leading to granuloma formation in different organs and tissues. TB has various clinical symptoms which are divided into intoxication and local syndromes. TB is a social problem, since it leads to significant economic expenses and first of all affects poor and asocial people.

TB is transmitted through inhalation of airborne droplets, discharged by a person with infectious TB disease while coughing or sneezing. Transmission is the spread of organism, such as *M. tuberculosis* from one person to another. *M. tuberculosis* may be expelled into the air. These particles, called droplet nuclei, are about 1 to 5 microns in diameter — less than 1/5000 of an inch. Droplet nuclei can remain suspended in the air for several hours, depending on the environment.

But not all forms of TB are infectious. People with extrapulmonary TB are usually non-infectious as well as people with LTBI. The risk of infection primarily depends on the time and strength of MBT effect. This risk is the biggest in people who have long and close contact with TB-infected person who spreads MBT.

This chapter presents the information about prevention, detection and treatment of pulmonary tuberculosis, since it poses the greatest risk of epidemic.

## 12.1. STRATEGIES FOR TB CONTROL

In May 2014, the World Health Assembly (Geneva, Switzerland) approved the Global Strategy «End TB» for the period 2016—2035 years, which is aimed at overcoming the existing obstacles in TB, MRTB, RRTB and HIV/TB control, summing the results of the implementation of the global plan «Stop TB», which was developed by the WHO Strategic working group on TB and was implemented over 2005—2015 period.

The main task of the new WHO Global Strategy for TB control up to 2035 is elimination of tuberculosis in the world to achieve zero level of morbidity and mortality from the disease, as well as ensuring that no family has the catastrophic costs of TB. Intermediate targets are planned for 2020, 2025 and 2030 years (Table 12.1).

The resolution calls on the government to adapt and implement strategy at the highest levels of commitment and financing. Particular attention is paid to the maintenance of groups which are particularly vulnerable to infection and have very limited access to medical care, such as migrants. The strategy and the resolution stress the need for coo-

peration with partners in the health sector and outside it in areas such as social protection, labor, immigration and justice.

One of the main methods of TB control is prevention.

*Table 12.1*

**Main stages for achieving the targets of WHO Global Strategy**

| Key indices | Benchmarks, % | | Targets, % | |
|---|---|---|---|---|
| | 2020 | 2025 | 2030 | 2035 |
| Reducing the incidence of TB in comparison with 2015 | 20 % (<80/ 100 000) | 50 % (<55/ 100 000) | 80 % (<20/ 100 000) | 90 % (<10/ 100 000) |
| Reducing the number of TB deaths compared to 2015 | 35 % | 75 % | 90 % | 95 % |

## 12.2. TB PREVENTION

TB prophylaxis consists of 3 main parts:

1. Measures conducted in the general population (vaccination and revaccination BCG, sanitary measures to protect risk group population from infection and superinfection);
2. Measures implemented in population groups at increased risk of developing tuberculosis (registration and medical check-up, rehabilitation, chemoprophylaxis);
3. Measures used in foci of infection (disinfection, isolation of patients, monitoring of contacts, chemoprophylaxis).

### 12.2.1. Vaccination

The most effective method of preventing tuberculosis is vaccination and revaccination with BCG vaccine (Fig. 12.1; Table 12.2).

In settings where TB is highly endemic or where there is a high risk of exposure to TB, a single dose of BCG vaccine should be given to all infants.

Neonatal BCG vaccination provides substantial protection against the more severe types of disseminated TB, such as miliary TB and tuberculosis meningitis, to which infants and small children are particularly susceptible. Neonates should receive one dose of BCG as soon as possible after birth. An infant, who had not received BCG dose after the birth, can be vaccinated until 12 months of age, after that no dose should be given.

To change from general to selective BCG vaccination, the efficient notification system should be in place in addition to the following criteria:

- average annual notification rate of smear-positive pulmonary TB cases is below 5 per 100 000; or

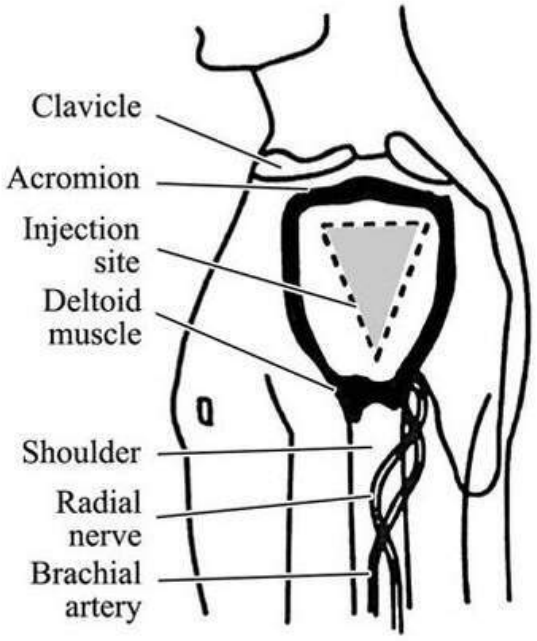



***Fig. 12.1.*** Schematic presentation of the vaccination site

- average annual notification rate of tuberculous meningitis in children aged under five years is below 1 per 10 million population during the previous five years; or
- average annual risk of tuberculous infection is below 0.1 %.

There is no evidence that revaccination with BCG affords any additional protection, and general revaccination is therefore not recommended.

However, given the serious consequences of developing multidrug-resistant disease and the low reactogenicity of the vaccine, BCG vaccination may be considered for all HIV-negative, unvaccinated, tuberculin-negative persons who are in unavoidable close exposure to multidrug-resistant tuberculosis (e.g., health care workers in facilities still lacking of proper TB infection control measures in place).

In children who are known to be HIV-infected, BCG vaccine should not be given.

In infants whose HIV status is unknown and who are born to HIV-positive mothers and who lack symptoms suggestive of HIV, BCG vaccine should be given after considering local factors. Such factors are likely to be important determinants of the risk-benefit balance of such an approach and include: coverage and success of the prevention of mother to child transmission of HIV program; the possibility of deferring BCG vaccination in HIV-exposed infants until HIV infection status has been established; availability of early diagnosing of HIV infection in infants; and, provision of early ART to HIV-positive infants.

The vaccine is injected intradermally at the boundary of the upper and middle thirds of the outer surface of a shoulder.

After 4—6 weeks, vaccination reaction is formed as an infiltration of 5—10 mm in diameter with a small knot in the center, covered with a crust; in some vaccinated people pustule is formed, followed by necrosis and a slight serous discharge.

Within 2—4 months, there is a gradual involution of pustule to form a circular scar 2—10 mm in diameter.

***The absence of the post-vaccination scar and negative Mantoux test with 2 TE indicate failure of BCG vaccination (immunity against TB is not formed).***

**Contraindications to BCG-vaccination:**

- ***Immunosuppression.*** BCG vaccination should not be given to persons who are immunosuppressed (e.g., persons who are HIV infected) or who are likely to become immunocompromised (e.g., persons who are candidates for organ transplant).
- ***Pregnancy.*** BCG vaccination should not be given during pregnancy. Even though no harmful effects of BCG vaccination on the fetus have been observed, further studies are needed to prove its safety.

*Table 12.2*

**Adverse effects of BCG vaccination**

| | |
|---|---|
| **Local** | |
| Injection site reactions | Reactions which have been reported include local subcutaneous abscess and keloids (thickened scar tissue) |
| Skin lesions distinct from the vaccination site | BCG can cause some cutaneous lesions (such as TB chancre, lupus vulgaris, scrofuloderma, papulonecrotic tuberculids, etc). |
| Lymphadenitis | When severe, this includes nodes which become adherent to overlying skin with or without suppuration. Suppuration has been defined as «the presence of fluctuation on palpation or pus on aspiration, the presence of a sinus, or large lymph node adherent to the skin with caseous lesions on excision». If BCG is administered in the recommended site (deltoid) the ipsilateral axillary nodes are most likely to be affected but supraclavicular or cervical nodes may also be involved. The onset of suppuration may be variable with cases presenting from one week to 11 months following vaccination. Lymphadenitis presenting within 2 months of vaccination and larger nodes (+1 cm) may be less likely to resolve spontaneously. Suppurative lymphadenitis is currently rare, especially when BCG inoculations are performed by well-trained staff, with a standardized freeze-dried vaccine and a clearly stated individual dose depending on the age of the vaccinated persons. |
| **Systemic** | |
| Osteitis and osteomyelitis | This is a rare and severe complication of BCG vaccination which is typically associated with changes in BCG vaccine strain. Most often it is localized near the epiphyses of long bones, in the spine, ribs. |
| Disseminated BCG disease or systemic BCG-itis | This recognized but rare consequence of BCG vaccination traditionally has been observed in individuals with severe cellular immune deficiencies. The risk (fatal and non-fatal) is thought to be ranged from 1.56 to 4.29 cases per million doses. As expected, the cellular primary immunodeficiency predisposes to the condition. This includes severe combined immunodeficiency, chronic granulomatous disease, DiGeorge syndrome and homozygous complete or partial interferon-gamma receptor deficiency. Early detection and diagnosing is critical to management. In patients with primary immunodeficiency disorders the disease may be fatal without reconstitution of immunity through stem cell transplant. |

## 12.2.2. Chemoprophylaxis

Another important method for preventing tuberculosis is chemoprophylaxis. It is divided into 2 groups:

***1. Primary prophylaxis.*** The drug is given to uninfected individuals to prevent the development of the disease (e.g., breast-fed infants), in smear-positive cases.

***2. Secondary prophylaxis***. Antituberculosis drugs are used to prevent the development of disease in previously infected people in the conditions of a possible re-infection or TB disease.

Latent tuberculosis infection (LTBI) is a state of persistent immune response to stimulation by *Mycobacterium tuberculosis* antigens without evidence of clinically manifested active TB.

To determine the indications for secondary chemoprophylaxis, mass tuberculin skin test and interferon-gamma release assay are used in children and adults at risk (Table 12.3, 12.4).

*Table 12.3*

**Interpreting TST reaction**

| 5 or more mm | 10 or more mm | 15 or more mm |
|---|---|---|
| Induration of 5 or more mm is considered positive for:<br>• people living with HIV;<br>• recent contacts of persons with infectious TB;<br>• people who have previously had TB disease;<br>• patients with organ transplants and other immunosuppressed patients (including patients taking a prolonged course of oral or intravenous corticosteroids or TNF-α antagonists) | Induration of 10 or more mm is considered positive for:<br>• people from areas of the world where TB is common (for example, Asia, Africa, Eastern Europe, Russia, or Latin America);<br>• people who inject illegal drugs, mycobacteriology lab workers;<br>• people who live or work in high-risk congregate settings;<br>• people with certain medical conditions that place them at high risk for TB (silicosis, diabetes mellitus, severe kidney disease, certain types of cancer, and certain intestinal conditions);<br>• children younger than 4 years;<br>• children and adults at high risk | Induration of 15 or more mm is considered positive for people with unknown risk factors for TB |

*Table 12.4*

**LTBI treatment regimens**

| Drug | Duration (months) | Interval | Minimum doses | Comments |
|---|---|---|---|---|
| Isoniazid | 9 | Daily | 270 | The preferred regimen is a daily treatment for 9 months.<br>Recommended regimen for people with HIV, children, and people with chest X-ray findings suggestive of previous TB disease.<br>DOT should be used with twice-weekly dosing. |
| | | Twice weekly | 76 | |
| Isoniazid | 6 | Daily | 180 | Not recommended for people with HIV, children, and people with chest X-ray findings suggestive of previous TB disease.<br>DOT should be used with twice-weekly dosing |
| | | Twice weekly | 52 | |
| Rifampin | 4 | Daily | 120 | Recommended for patients who have isoniazid-resistant, rifampin-susceptible LTBI.<br>Alternative for people who cannot tolerate isoniazid.<br>Not recommended for HIV-infected patients on certain combinations of ARV therapy; rifabutin may be used instead |

## 12.2.3. Infection control

TB is a communicable disease. On average, 30—40 % of close contacts with a person who has infectious TB disease, leads to infection with *M. tuberculosis*. However, TB patients vary in their infectiousness; some infect most or all of their close contacts, whereas others infect few or none of their contacts. Close contacts are defined as persons who share the same air space in a household or other enclosed environment for a prolonged period (days or weeks, not minutes or hours) with a person with suspected or confirmed TB disease.

Specifically, health departments should be able to assist health care settings with:

- reporting confirmed or suspected TB cases as quickly as possible;
- conducting contact investigations;
- providing a plan for TB patients to receive follow-up care after they are discharged;
- testing, monitoring, outbreak investigations, and other aspects of TB infection-control program.

The main goals of TB infection-control program are to ensure early and timely:

- detection of TB disease;
- isolation of people who have or are suspected of having TB disease (airborne precautions);

- treatment of people who have or are suspected of having TB disease.

***The three-level control includes:***

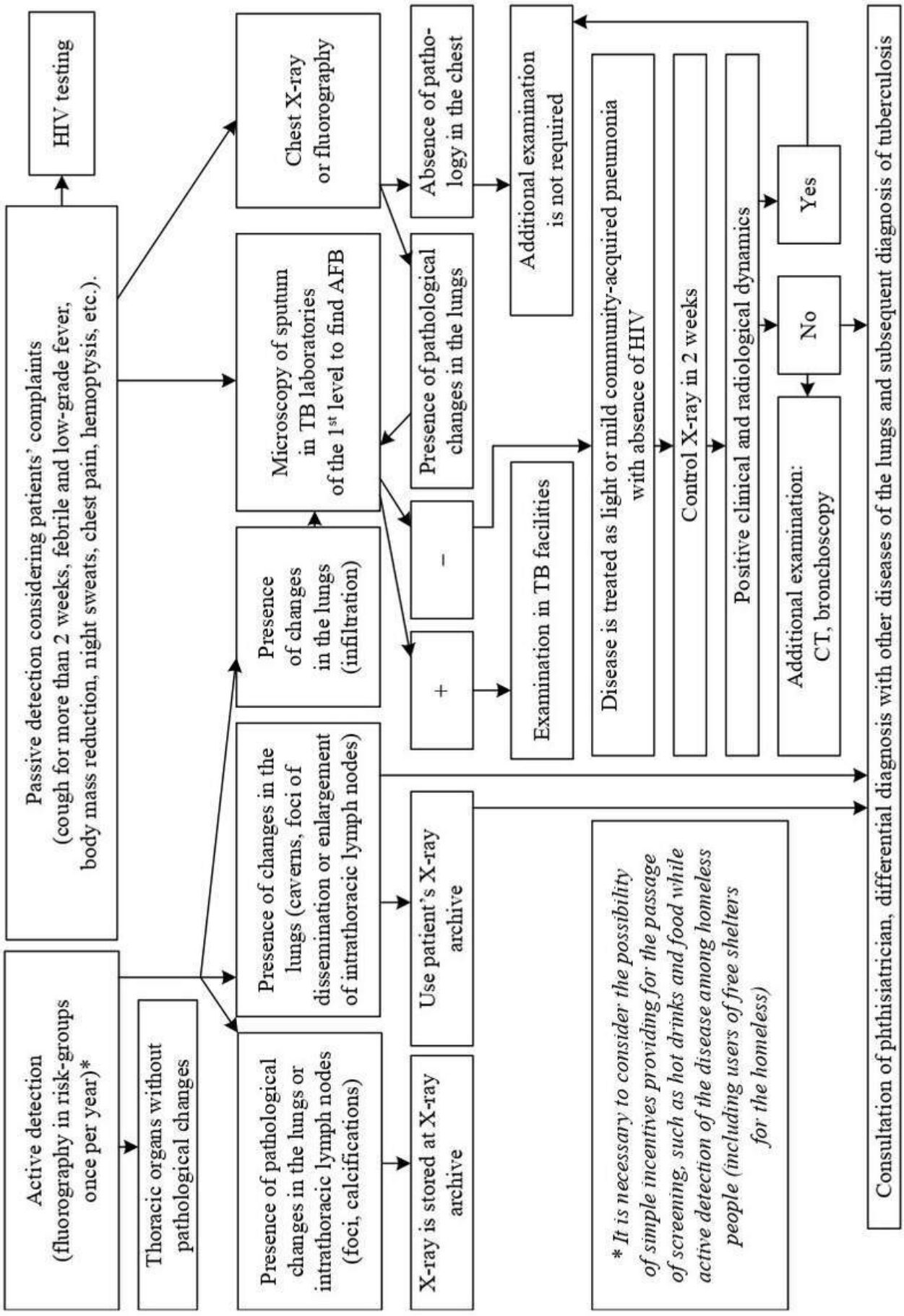
- administrative control;
- environmental control;
- respiratory-protection control.

**TB Infection-Control Program. Levels of control**

| **Administrative control** |
|---|
| • Assign responsibility for TB infection control<br>• Conduct TB risk assessment<br>• Develop and institute a written TB infection-control plan<br>• Ensure the timely availability of recommended laboratory processing, testing, and reporting of data<br>• Implement effective work practices for the management of patients with suspected or confirmed TB disease<br>• Ensure proper cleaning and sterilization or disinfection of potentially contaminated equipment<br>• Train and educate health care workers<br>• Test and evaluate health care workers for TB infection and disease<br>• Apply epidemiologic-based prevention principles<br>• Use posters and signs demonstrating and advising respiratory hygiene and cough etiquette<br>• Coordinate efforts with the local or state health department |
| **Environmental control** |
| Reduce concentration of infectious droplet nuclei through following methods:<br>ventilation technologies, including<br>• natural ventilation;<br>• mechanical ventilation.<br>o High-efficiency particulate air filtration (HEPA)<br>o Ultraviolet germicidal irradiation (UVGI) |
| **Respiratory-protection control** |
| • Implement a respiratory protection program<br>• Train health care workers on respiratory protection<br>• Educate patients on respiratory hygiene and the importance of covering their cough |

## 12.3. TUBERCULOSIS DETECTION

Detection of tuberculosis usually takes place at the primary care level and is divided into active (early — TST, chest X-ray) and passive (late — presence of complaints and anamnesis, physical examination, X-ray and sputum microscopy; Scheme 12.1).




***Scheme 12.1.*** Algorithm for tuberculosis detection