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# Tuberculosis

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# Tuberculosis

- **Infectious disease caused by *M. tuberculosis*, *M. africanum*, *M. bovis*, *M. BCG*, *M. microti*, *M. canetti*, *M. caprae*, *M. pinnipedii***
- ***M.bovis* eradicated in the 1960s**
- **Lungs – most frequently affected organ (80 - 90%)**
- **= most frequent type of transmission is by coughing**
- **Other organs include the kidneys, bones, urogenital organs, intestine**



# TB in the Czech Rep. and in the world

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- 10.4 million TB cases worldwide (in 2016)
- 1.9 billion people infected (= latent TB infection)
- 1.7 million deaths worldwide in 2016 (0.25 million children)
  
- In the Czech Rep.: incidence 4.9 cases/100 000 persons (2016) = ca 510 cases
- Persons at higher risk of TB: HIV-positive, immigrants, homeless



# Clinical symptoms of TB

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- Chronic cough (4 and more weeks)
- Chest pain
- Weight loss, anorexia
- Fatigue
- Hemopytsis
- **Night sweat and fevers**
- Contact with an infected person
- CXR finding compatible with TB diagnosis



# Forms of TB

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- Primary TB
- Post-primary TB (progression of latent TB) – in chronic diseases, malignancies, older age
- Secondary TB (infection by other TB strain)

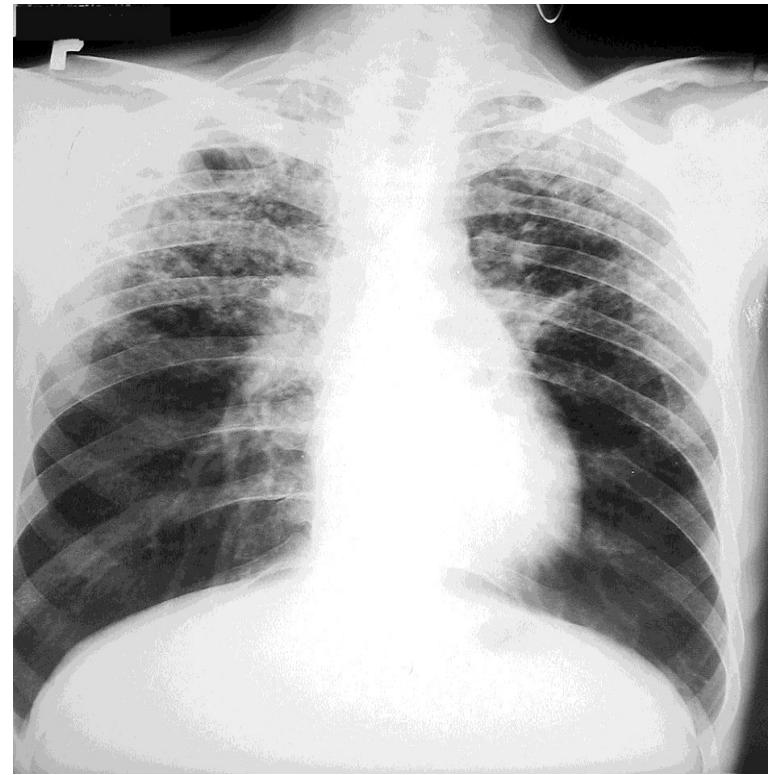
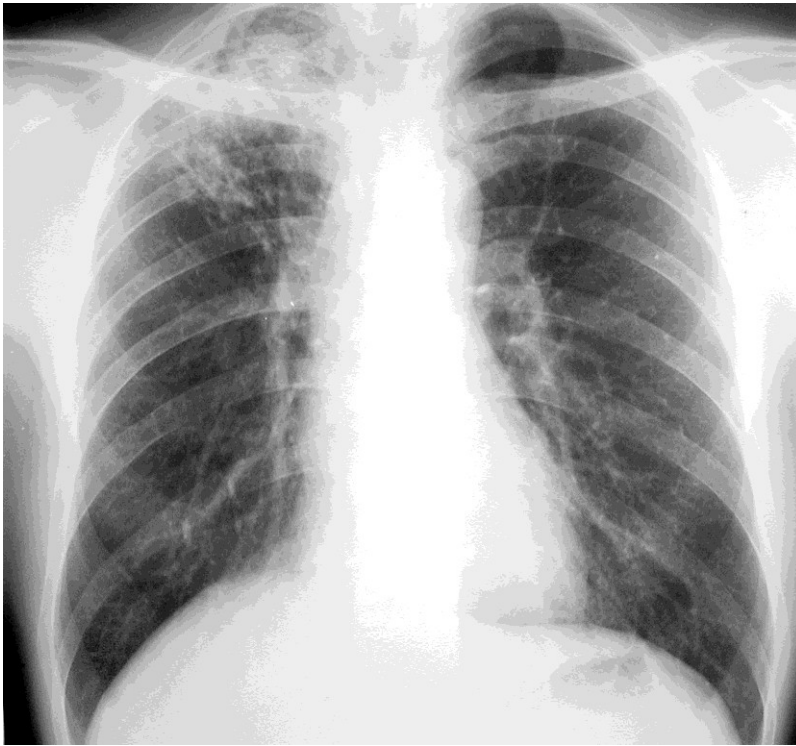


# Diagnosis

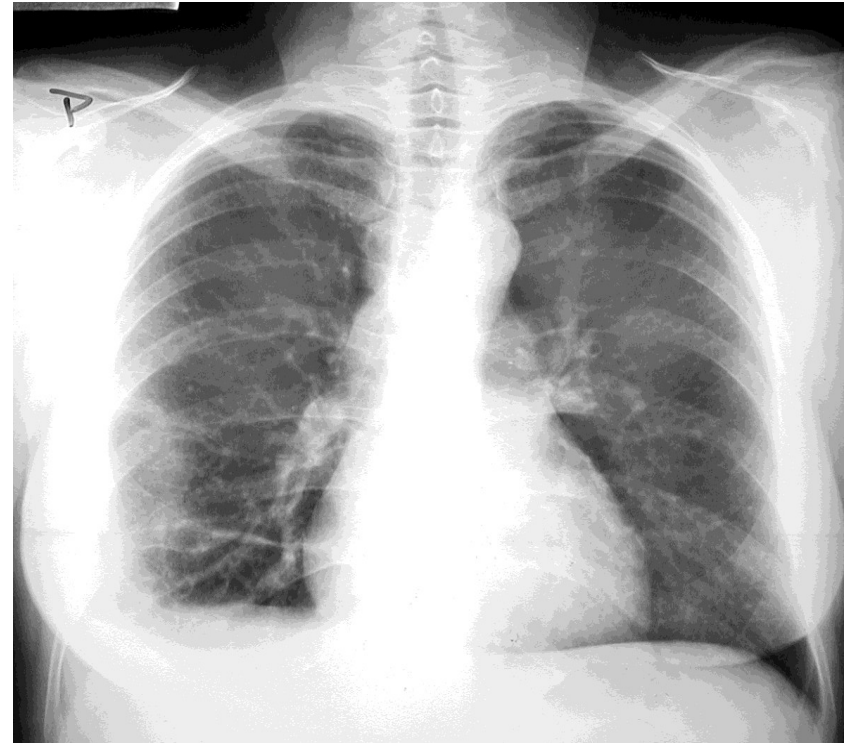
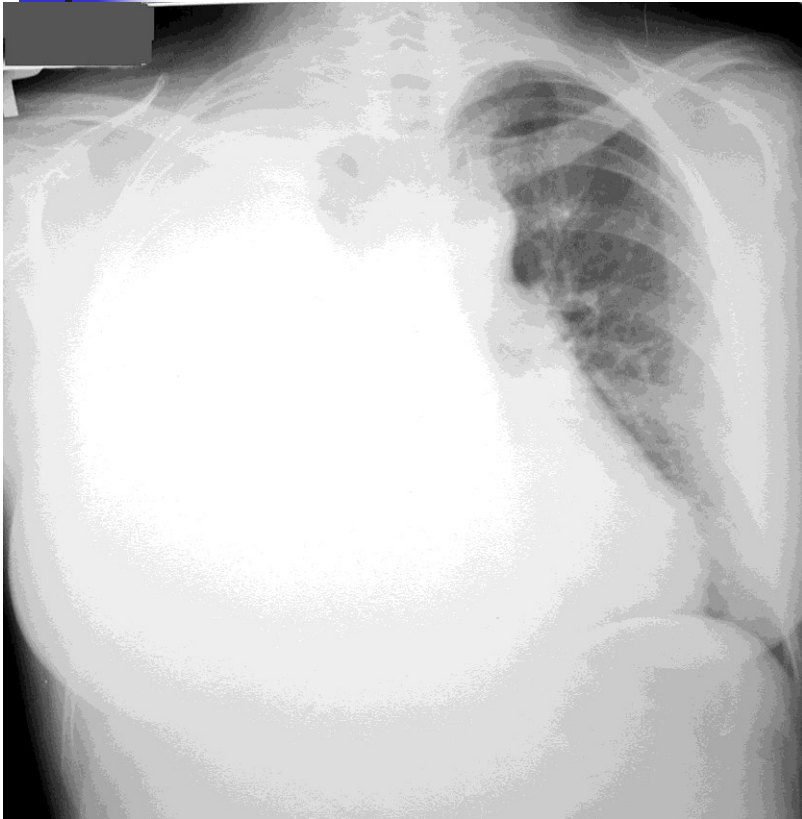
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- Anamnesis
- Epidemiology
- CXR finding
- Tuberculin skin test
- **Bacteriology** (sputum, bronchoalveolar lavage fluid, other)
- **Histology**

# TB – upper lobes (typical)

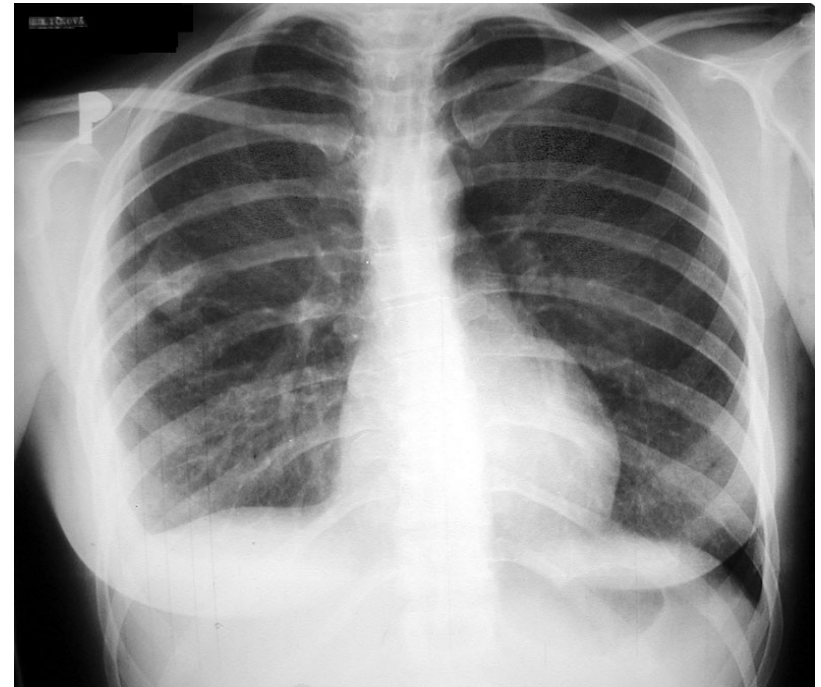


# TB pleurisy

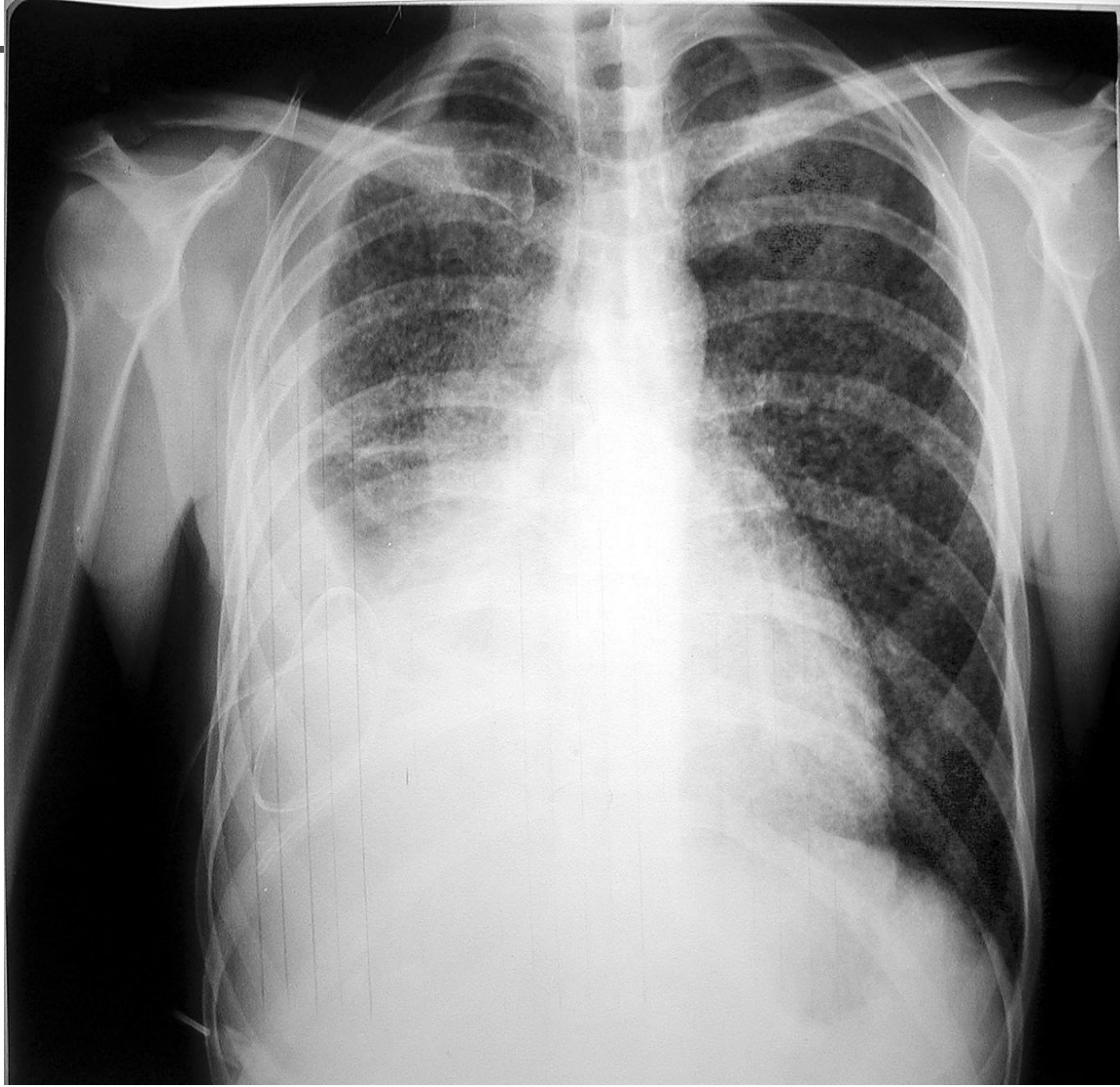




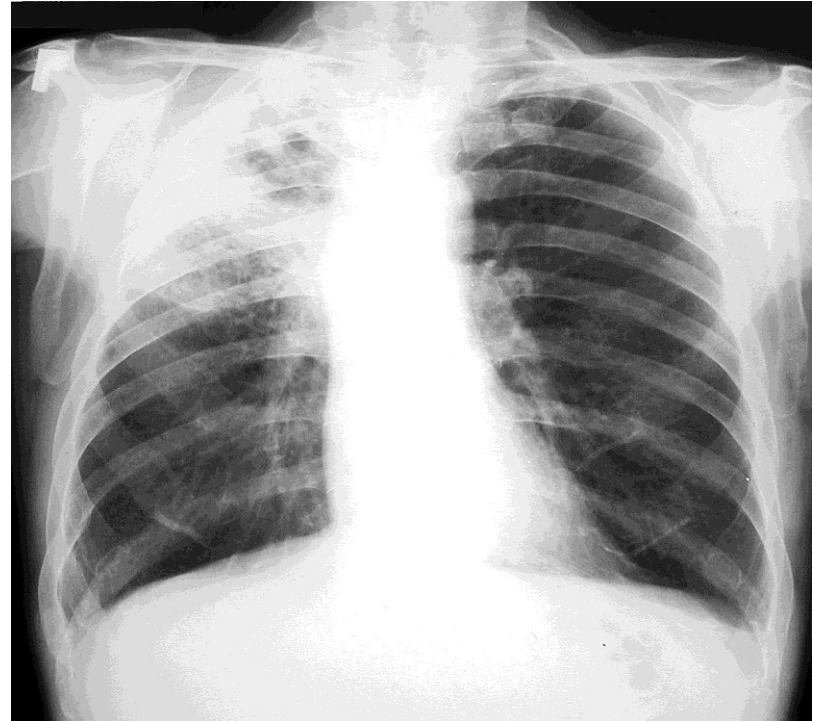
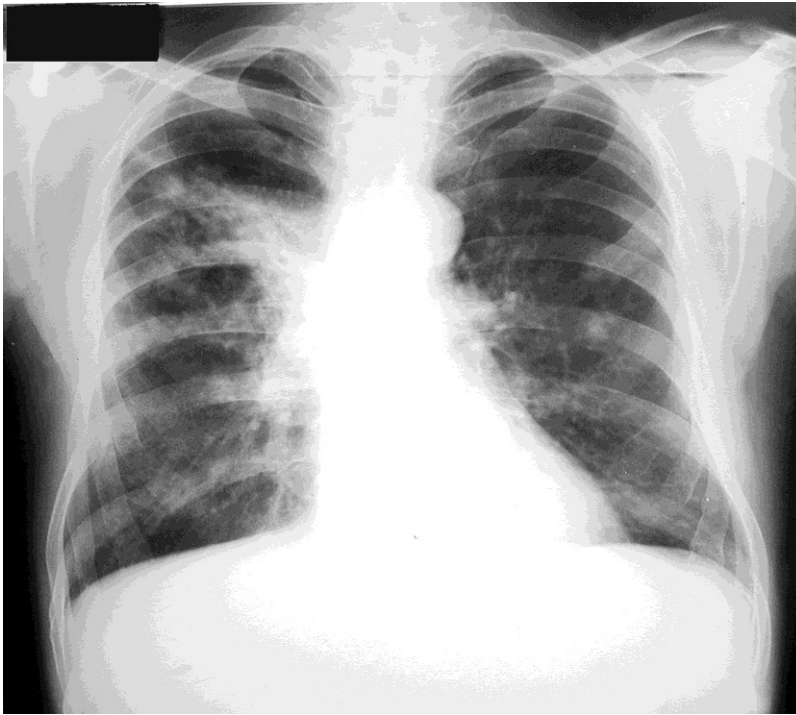
# TB pleurisy and pulmonary TB



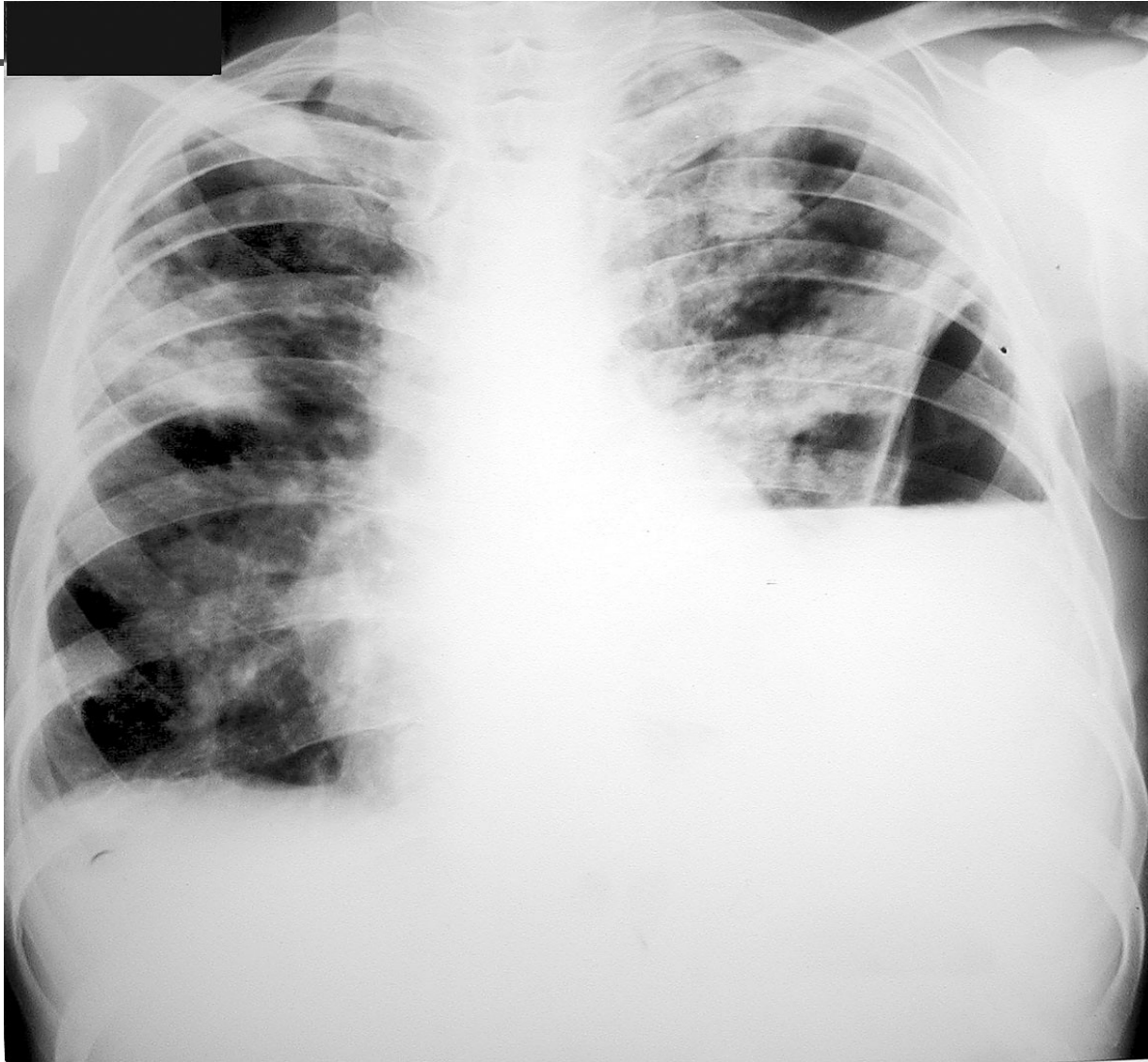
# Miliary TB



# Pulmonary TB – less typical forms



# Complicated TB







# Bacteriology - methods

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- Microscopy
- Cultivation – 6 weeks!
- Rapid bacteriology tests – detection of metabolic activity of *M.tuberculosis* :  
Bactec and MGIT tests – 10-14 days
- PCR method

# HISTORY OF TB TREATMENT



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- Until 1882: climatotherapy
- Since 1882: iatrogenic pneumothorax, thoracic surgery
- Mortality of untreated TB: ca 50%
- In the 1940s and 50s: discovery of antituberculous drugs (ATDs)
- Since 1970s: WHO-recommended treatment regimen: ***Directly Observed Treatment Short-Course = DOTS***



# Phases of TB treatment

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- Intensive phase (initial) – 2 months, usually hospitalization: 4-combination of 1st class ATDs
- = combined of INH,RMP,PZA,EMB
  
- Continuation phase – 4 months, usually outpatient care
- = combined of INH+RMP



# TB in the world

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- >80% of cases occur in 8 countries (India, Indonesia, China, Pakistan, Bangladesh, The Philippines, RSA, Nigeria)
- Highest incidence rate in the world (2017): Lesotho, Eswatini and RSA
- Highest incidence rate in Europe: Greenland and Republic of Moldova
- Highest incidence rates – other continents: Bolivia, Haiti, Mexico, Vanuatu





# Be aware of...

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- Coincidence of TBC and HIV
- 40% of HIV-related deaths are caused by TB
- Increasing rate of drug-resistant forms worldwide
- MDR-TB: resistance to RMP+INH (ca 0.5mil.cases reported in 2017 worldwide)
- XDR-TB: res.to RMP+INH+fluoroquinolone+aminoglycoside
- TDR-TB: resistance to all first-class drugs + a number of ATDs of the 2<sup>nd</sup> to 5<sup>th</sup> classes