



CHEST RADIOGRAPHY FOR TUBERCULOSIS DETECTION



ABOUT CHEST RADIOGRAPHY

X-ray based examinations are crucial in a variety of medical setting and at all major levels of health care. Chest radiography, or chest X-ray (CXR) is an essential tool for early detection of tuberculosis (TB), and therefore fundamental to achieving the targets set out in WHO's End TB Strategy. CXR is a rapid imaging tool that allows for easy identification of lung abnormalities. CXR has high sensitivity, but limited specificity for the diagnosis of pulmonary TB. It is therefore especially suitable for screening and triaging. Recommendations on CXR are included in several WHO policies, summarized below.

CHEST RADIOGRAPHY: AN ESSENTIAL TOOL TO END TB

CXR IS A SENSITIVE TOOL FOR SCREENING FOR ACTIVE TB

Reference: [Guidelines on systematic screening for active TB](#)

- CXR has much higher sensitivity for pulmonary TB than screening for TB symptoms.
- CXR can also be used as a supplementary diagnostic tool, although the specificity is low. A bacteriologically-confirmed diagnosis is always preferred.

AN ABNORMAL CXR IS AN INDICATION FOR FULL DIAGNOSTIC EVALUATION

Reference: [The International Standards of TB Care](#)

- All patients with unexplained findings suggestive of tuberculosis on CXR should be evaluated for TB with a bacteriological diagnostic test.

CXR IS AN IMPORTANT TOOL FOR CHILDHOOD TB DIAGNOSIS

Reference: [Guidelines on childhood TB](#)

- CXR is useful in the diagnosis of pulmonary and extrapulmonary TB in children, in combination with history, evidence of TB infection and microbiological testing.

CXR CAN IMPROVE THE EFFICIENCY OF XPERT MTB/RIF USE

Reference: [Implementation manual on Xpert MTB/RIF](#)

- CXR and further clinical assessment can be used to triage who should be tested with Xpert MTB/RIF in order to reduce the number of individuals to be tested with Xpert MTB/RIF, as well as to improve pre-test probability of TB.

CXR CAN ASSIST THE DIAGNOSIS OF TB AMONG PEOPLE LIVING WITH HIV

Reference: [Consolidated guidelines on the use of ARV drugs for treating and preventing HIV infection \(forthcoming publication\)](#)

- CXR can assist the diagnosis of TB among people living with HIV. It is particularly useful to rule out TB disease before the provision of treatment for latent TB.

CXR HELPS RULE OUT ACTIVE TB BEFORE TREATING LATENT TB INFECTION

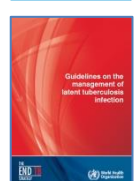
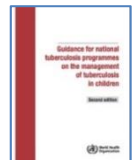
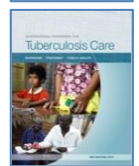
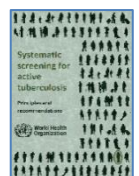
Reference: [Guidelines on management of latent TB infection](#)

- Symptom screening and CXR should be done to exclude active TB before initiating treatment of latent TB infection.
- Individuals with TB symptoms or any radiological abnormality should be investigated further for active TB and other conditions.

CXR IS AN ESSENTIAL TECHNOLOGY FOR PREVALENCE SURVEYS

Reference: [Guidelines on TB prevalence surveys](#)

- CXR is a necessary screening tool to identify survey participants eligible for bacteriological examination.





Some limitations of CXR

- Produces two dimensional representation of a three-dimensional structure;
- Intra and inter-reader variability;
- No abnormalities are definitive of TB, therefore the specificity is low;
- Lack of universally accepted reporting system
- Difficult to ascertain disease activity;
- Exposure to ionizing radiation;
- Special equipment (with adequate input power) needed;
- Trained personnel required for operation and interpretation;
- Limited access, especially in low- and middle-come countries.

Digital vs. conventional CXR

- Digital CXR has many advantages over conventional CXR, especially after recent advances in digital technologies;
- Few consumables required and therefore lower running costs (although investment costs are higher);
- Lower radiation dose;
- More convenient portable systems allowing easier use in mobile units and outreach activities;
- Allows for electronic transmission of images for telemedicine, quality assurance and research;
- Better archiving possibilities;
- Better image quality;
- Possibilities to develop and apply tools for computer-aided detection (CAD)

KEY ACTIONS MOVING FORWARD

WHO with partners is working on facilitating the roll out and effective use of CXR in countries. The following actions will be taken by WHO in 2016:

- Prepare an operational guide on chest radiography and organize a global consultation for its finalization;
- Perform a review of available evidence on computer-aided radiographic TB detection, and organize a scoping meeting to determine if WHO guidelines should be developed and determine the research needs.