Module 8

Child TB Management and IMCI

International Union Against Tuberculosis and Lung Disease

World Health Organization

TB in children

- Tuberculosis (TB) in children is common wherever TB is common in adults
- TB is an important cause of illness and death in children
- History of possible contact with a TB case is an important step in assessment of a child with possible TB
- TB in children presents in a wide variety of clinical syndromes - common forms include pulmonary TB and TB lymph nodes
- Many child TB cases can be successfully managed as an outpatient

National TB control data

- *This slide could include recent data of TB control indicators from the National TB control programme*

Risk factors for TB infection and disease in children

For TB infection

- Contact with source case
  - Closeness of contact
  - Duration of contact
- Source case characteristics
  - Smear positivity
  - Cavities on CXR
- Increased exposure
  - Living in high TB endemic communities
  - Children of families living with HIV

For TB disease

- Young age
  - < 5 years of age
- Immunosuppression
  - HIV
  - Malnutrition
  - Post-measles
- Not BCG vaccinated
  - Risk of disseminated disease

Common scenarios for district facility-based worker in diagnosis and management of child TB

1. Child (inpatient or outpatient) with *persistent symptoms and/or signs not responding to first-line recommended treatment* – suspected TB case

2. Child who is a household or close contact of an infectious case of TB

Suspect diagnosis of TB in a child

Suspect diagnosis of TB in a child

- Common forms of TB in children are pulmonary TB and lymph node TB

- History of contact is important

- At initial assessment, decision needs to be made about need for referral for further investigation and/or immediate management – or
  whether the need is for further follow-up assessment

- Children with suspected pulmonary TB that can provide sputum (usually > 5 years) should have sputum taken for microscopy

Suspected TB in IMCI

Common clinical presentations to suspect TB in children:

- Cough, including severe pneumonia not improving
- Weight loss or failure to gain weight, including severe malnutrition
- Fever
- Lymph node enlargement

Especially if symptoms persist (>2 weeks) without improvement following other appropriate therapies

- broad-spectrum antibiotics for pneumonia; or
- anti-malarial treatment for fever; or
- nutritional rehabilitation for malnutrition

Atypical clinical presentations of PTB

Acute severe pneumonia

Presents with fast breathing and chest indrawing

Occurs especially in infants and HIV-infected children

- Suspect PTB if poor response to antibiotic therapy AND especially if a positive contact history as there will be in most cases
- If HIV-infected also suspect other HIV-related lung disease e.g. PcP

Wheeze

- Asymmetrical and persistent wheeze can be caused by airway compression due to enlarged tuberculous hilar lymph nodes
- Suspect PTB when wheeze is asymmetrical, persistent, not responsive to bronchodilator therapy and associated with other typical features of TB
- Assess nutritional status: children with asthma are usually well nourished; those with TB are usually under-nourished
- Check for history of foreign body aspiration

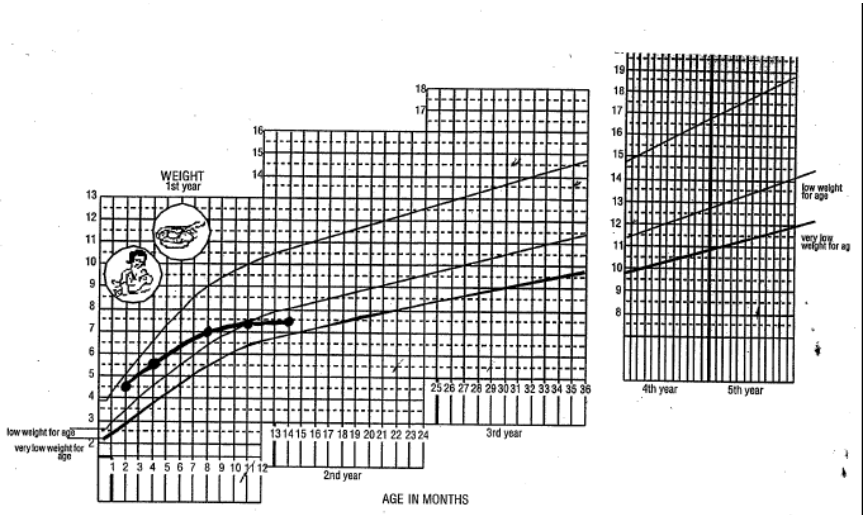
History of contact

note the following…….

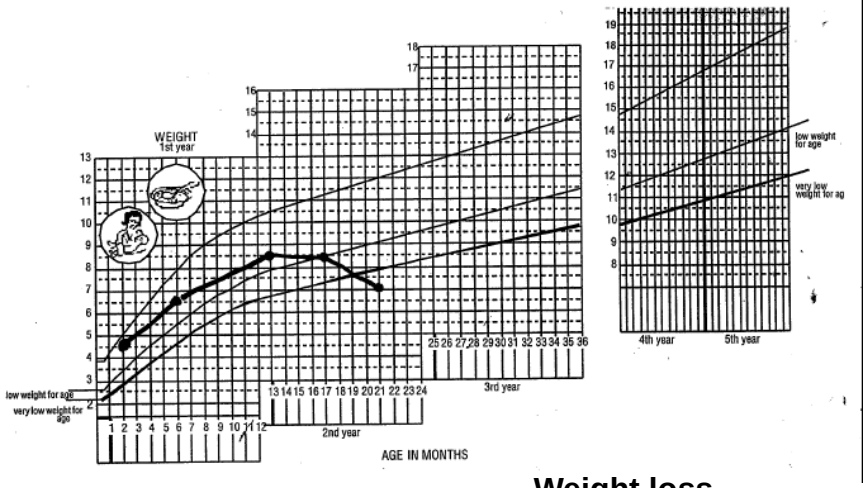
- ❖ Closeness of contact
- ❖ Sputum smear result of index case (if known)
- ❖ Timing of contact
  children usually develop TB within 2 years after exposure and most (90%) within the first year

- ❖ If no source case is identified, always ask about anyone in household with cough – if so, request assessment of that person for possible TB

Check weight, record weight and compare to previous weights



Growth faltering or failure to thrive



Weight loss

HIV test

note the following…….

- ❖ there is marked clinical overlap between TB and HIV in children
- ❖ HIV-infected children are at marked risk of TB
- ❖ HIV-infected children are at risk of other causes of lung disease presenting with chronic cough and malnutrition
- ❖ HIV infection has an impact on TB treatment outcome and requires additional care (eg CPR and ART)

All children with suspected TB should be tested for HIV

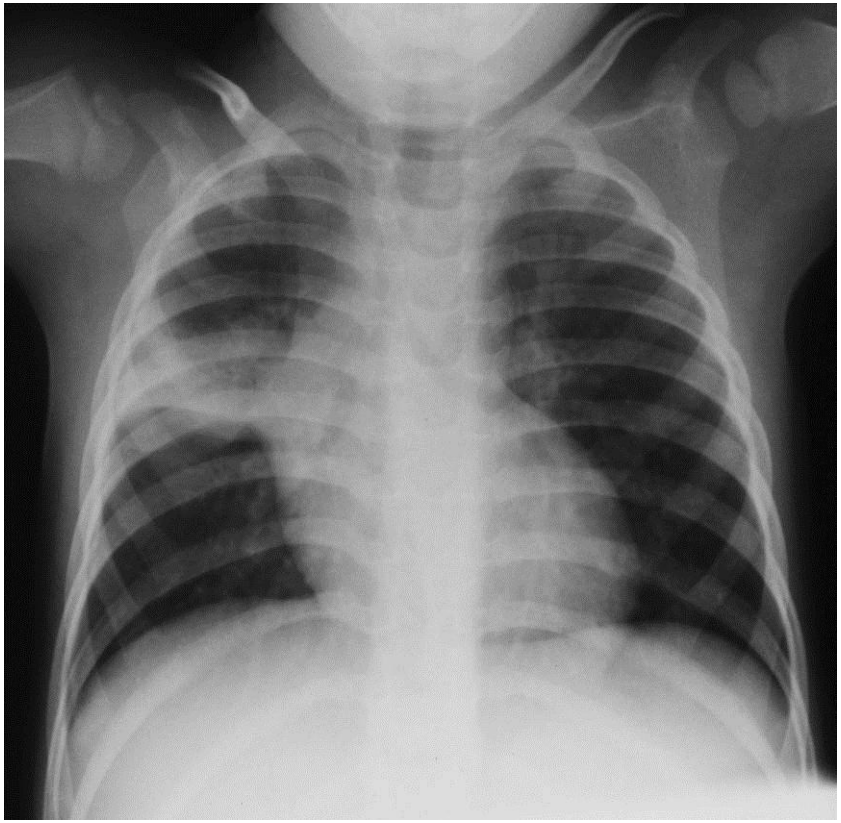
CXR is an important tool for diagnosis of PTB in children

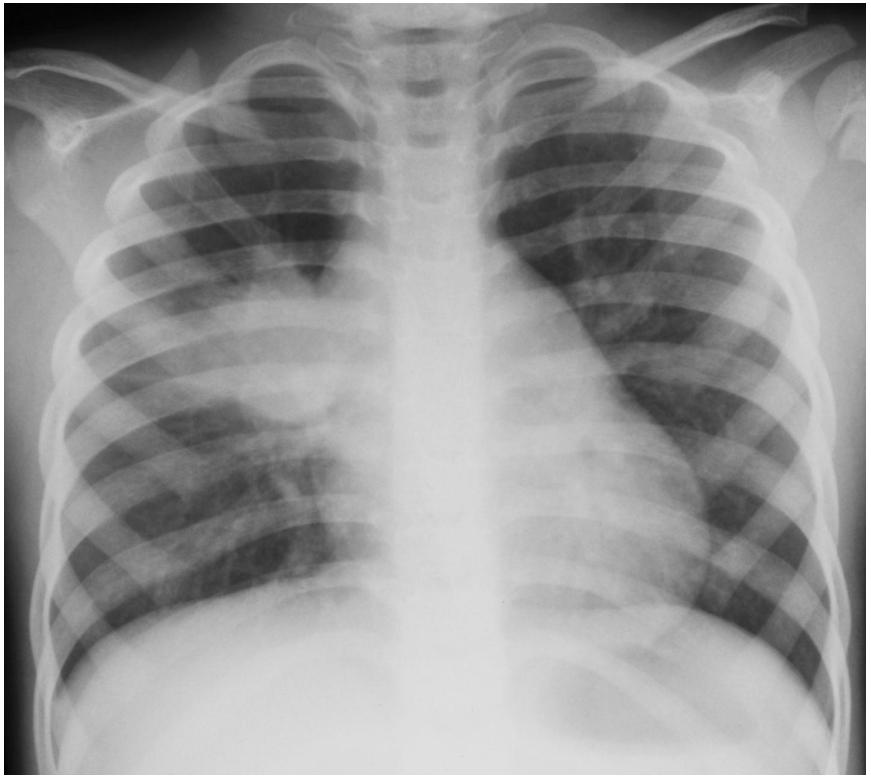
Commonest abnormality is due to lymphadenopathy and tends to be asymmetrical

CXR does have limitations especially as quality of CXR is often poor and no lateral view available

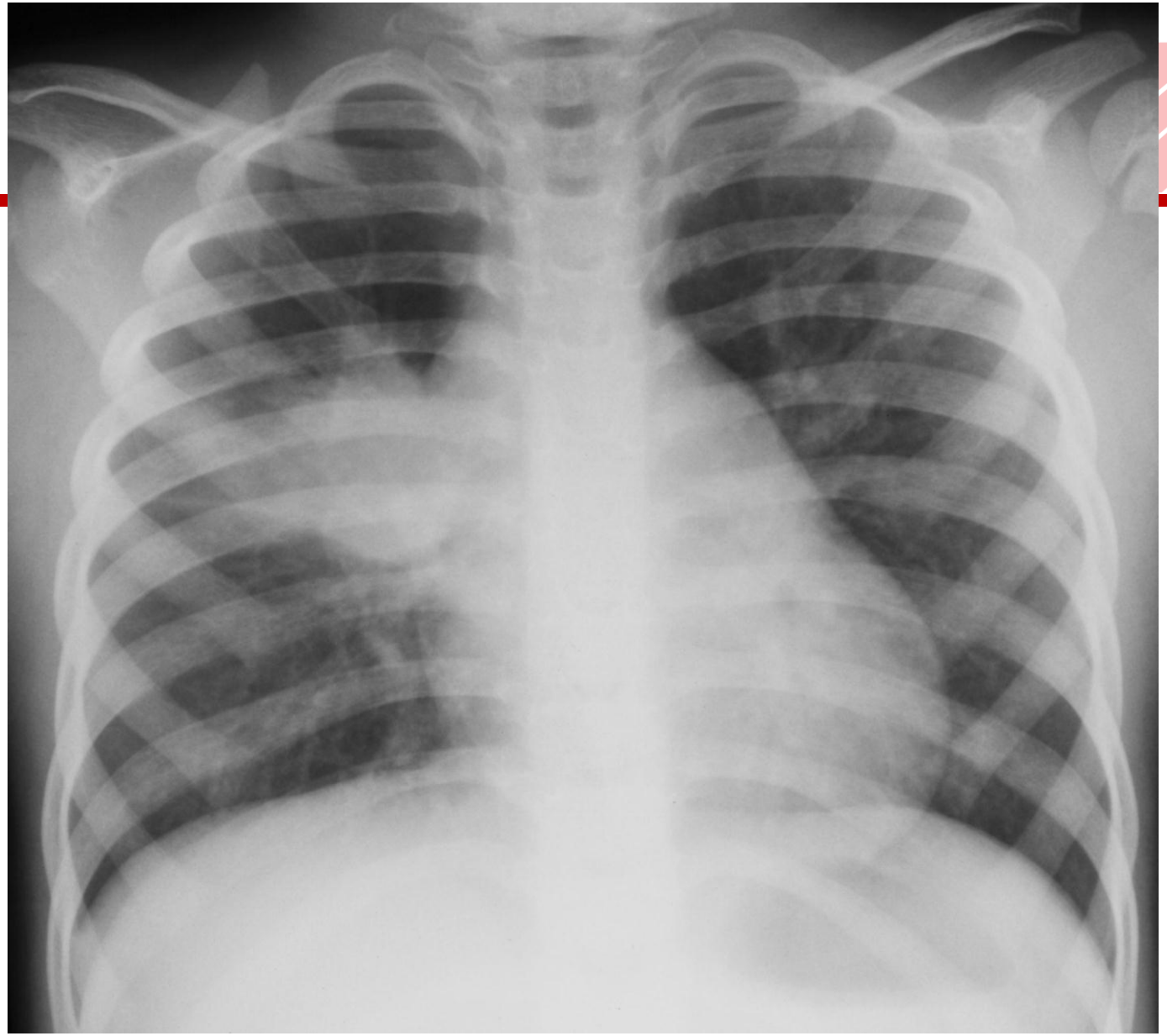
Diagnostic atlas of intrathoracic tuberculosis in children: a guide for low-income countries 2003.

Robert Gie, IUATLD

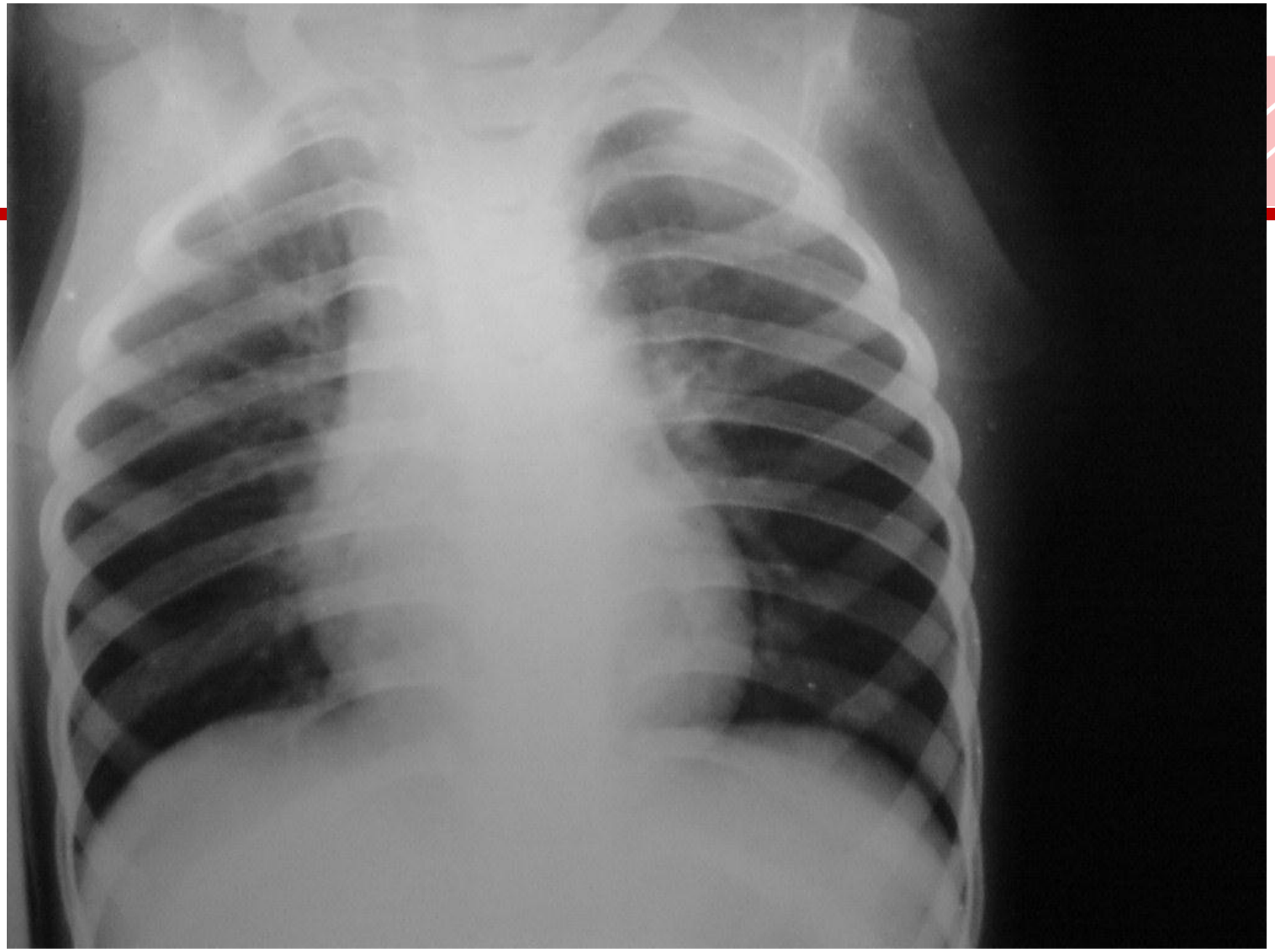




Freely available on-line

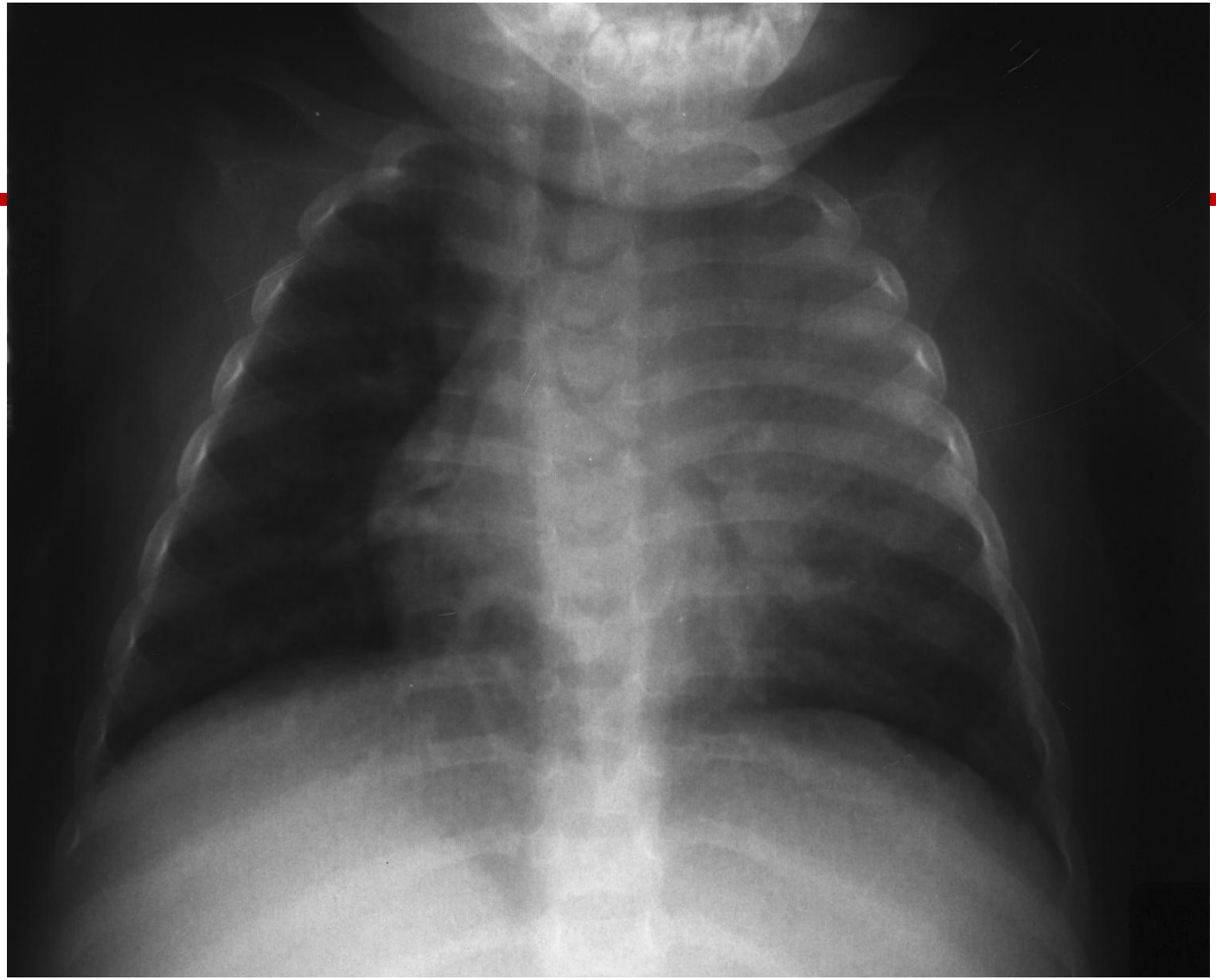


Obvious right perihilar adenopathy with surrounding inflammatory changes
Perihilar lymphadenopathy is a common radiological finding in children with PTB

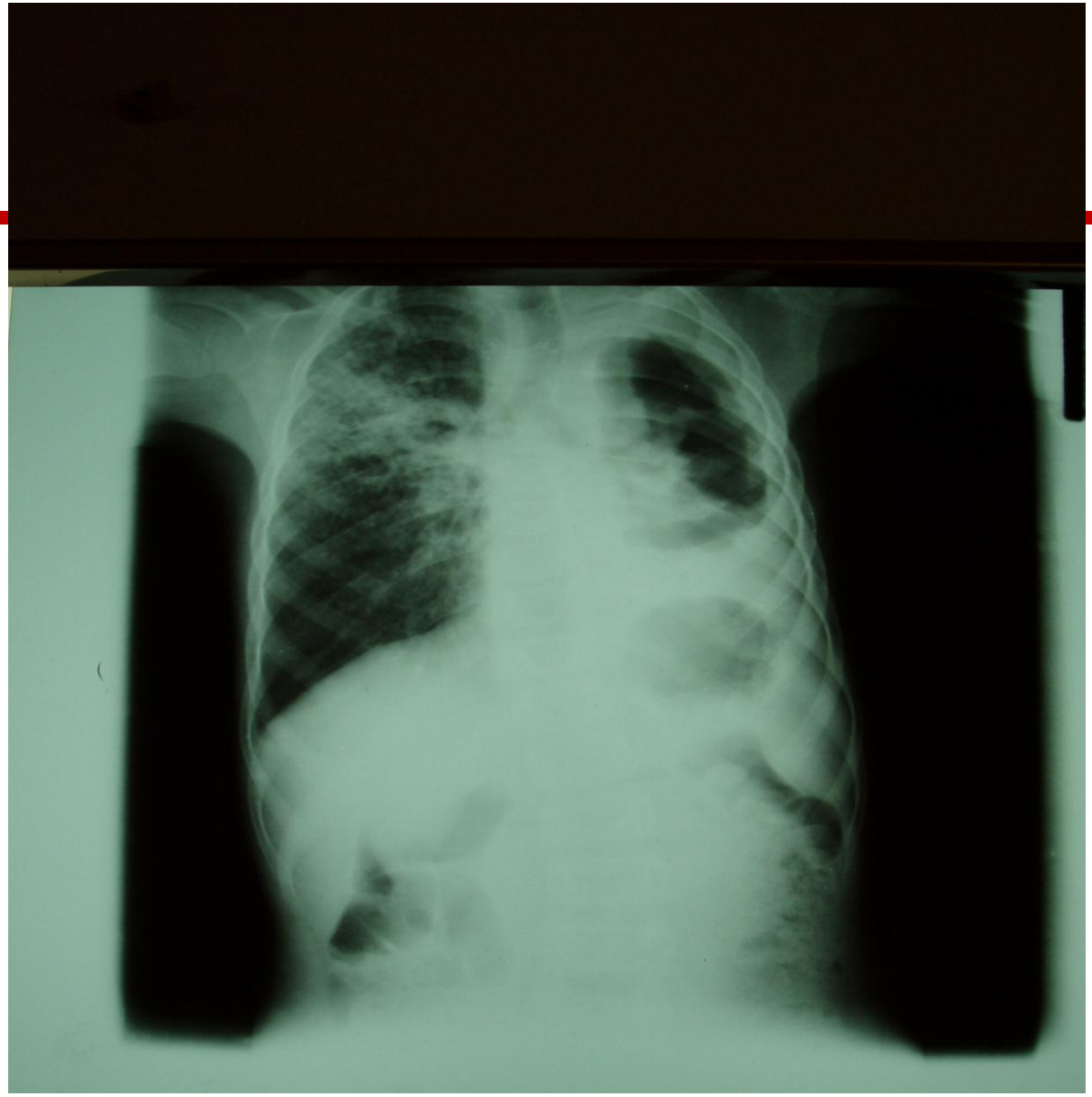


Perihilar lymphadenopathy is not always so obvious as previous CXR and may appear as widened mediastinum.

Lateral X-ray helpful. Normal thymic shadow in infants may appear as widened mediastinum on AP film (typical sail sign).



The consequences of intrathoracic lymphadenopathy is responsible for much of the parenchymal disease by airway compression (as seen here) and/or rupture of nodal TB abscess into airways.



Adolescents with PTB present with similar picture to adults with cavities and often sputum smear-positive disease.

Diagnosis of TB adenitis

TB adenitis is most common in cervical region. Lymph node enlargement is painless and asymmetrical, often multiple, discreet or matted.

Nodes are typically large (>2 x 2 cm) i.e. visibly enlarged not just palpable.

Lymph node enlargement is persistent (>1 month) and not responsive to other treatment such as antibiotics.

Sinus and discharge may develop.

Usual age is 2-10 years.

May or may not be associated with other symptoms of TB.

Clinical approach to diagnosis of EPTB

TB can present in many different ways including as extra-pulmonary disease such as TB meningitis, TB pleural effusion, TB ascites or osteoarticular disease (e.g. spine, hip, knee)

Clinical presentation will depend on site

The table on next slide lists typical clinical features of forms of EPTB and suggested investigations for each category.

Symptoms vary depending on site of disease and characteristically are persistent, progressive and may be associated with weight loss or poor weight gain.

Clinical assessment in all cases should consider:

History of contact

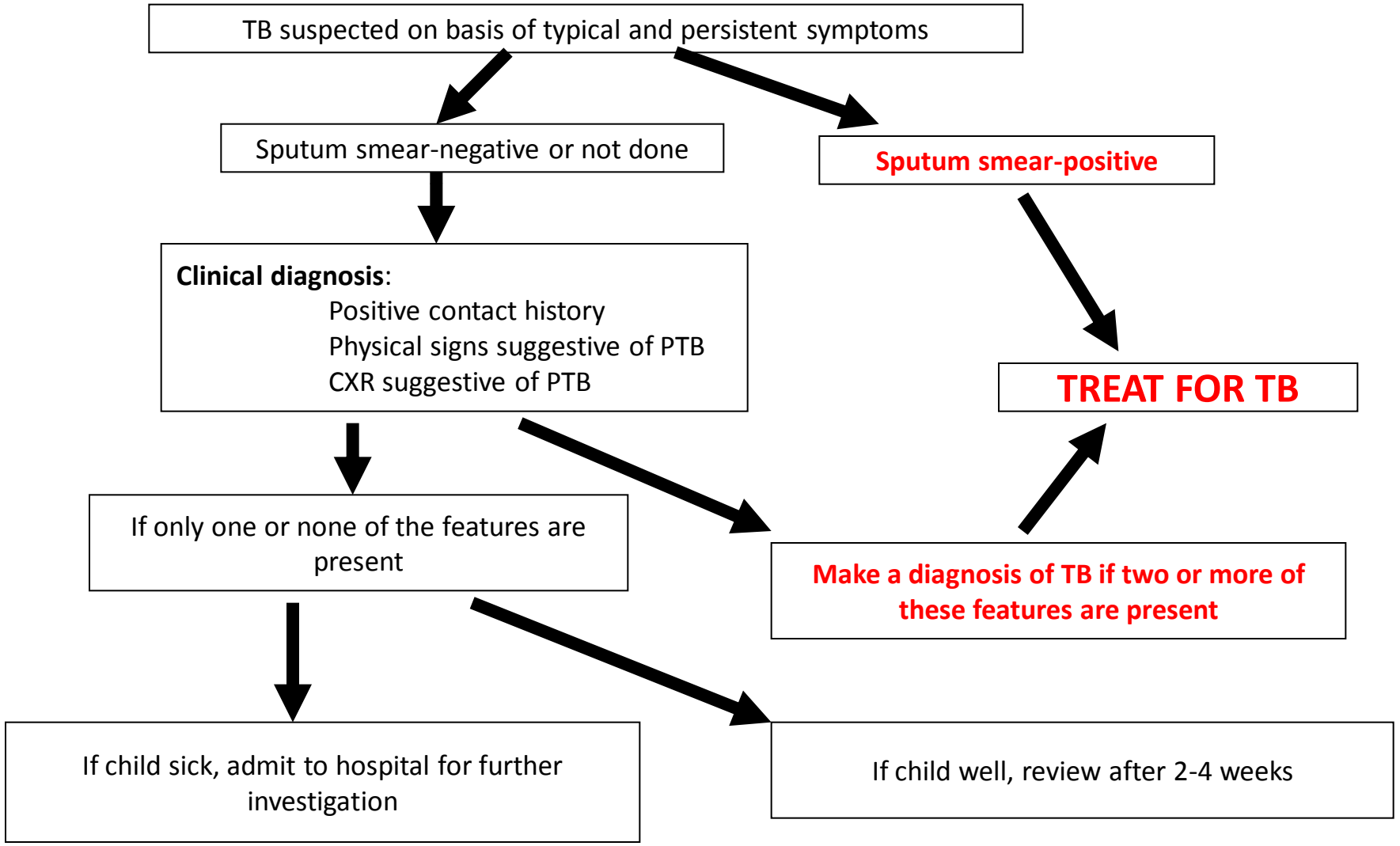
Sputum for smear microscopy

HIV test

Site of EPTB	Typical clinical presentation	Investigation	Comment
TB adenitis	Asymmetrical, painless, non-tender lymph node enlargement for more than one month +/- discharging sinus Most commonly in neck area	Fine needle aspiration when possible for culture and histology TST usually positive - not necessary for diagnosis	Treat If axillary node enlarged on same side as BCG, consider BCG disease
Pleural TB	Dullness on percussion and reduced breath sounds +/-chest pain	CXR Pleural tap#	Treat If pus in pleural tap, consider empyema
Usually young (< 5 years) with disseminated disease and severely ill			
TB meningitis	Headache, irritability/abnormal behaviour, vomiting (without diarrhoea), lethargic/reduced level of consciousness, convulsions, neck stiffness, bulging fontanelle, cranial nerve palsies	Lumbar puncture obtain CSF# CXR	Hospitalise for TB treatment §
Miliary TB	Non-specific, lethargic, fever, wasted	CXR	Treat and refer §
Usually 5 years and older			
Abdominal TB	Abdominal swelling with ascites or abdo masses	Ascitic tap#	Refer §
Spinal TB	Deformity of spine May have lower limb weakness/paralysis	X-ray spine	Refer §
Pericardial TB	Cardiac failure Distant heart sounds Apex beat difficult to palpate	CXR Cardiac ultrasound Pericardial tap#	Refer §
TB bone and joint	Swelling end of long bones with limited movement Unilateral effusion of usually knee or hip	X-ray bone/joint Joint tap#	Refer §

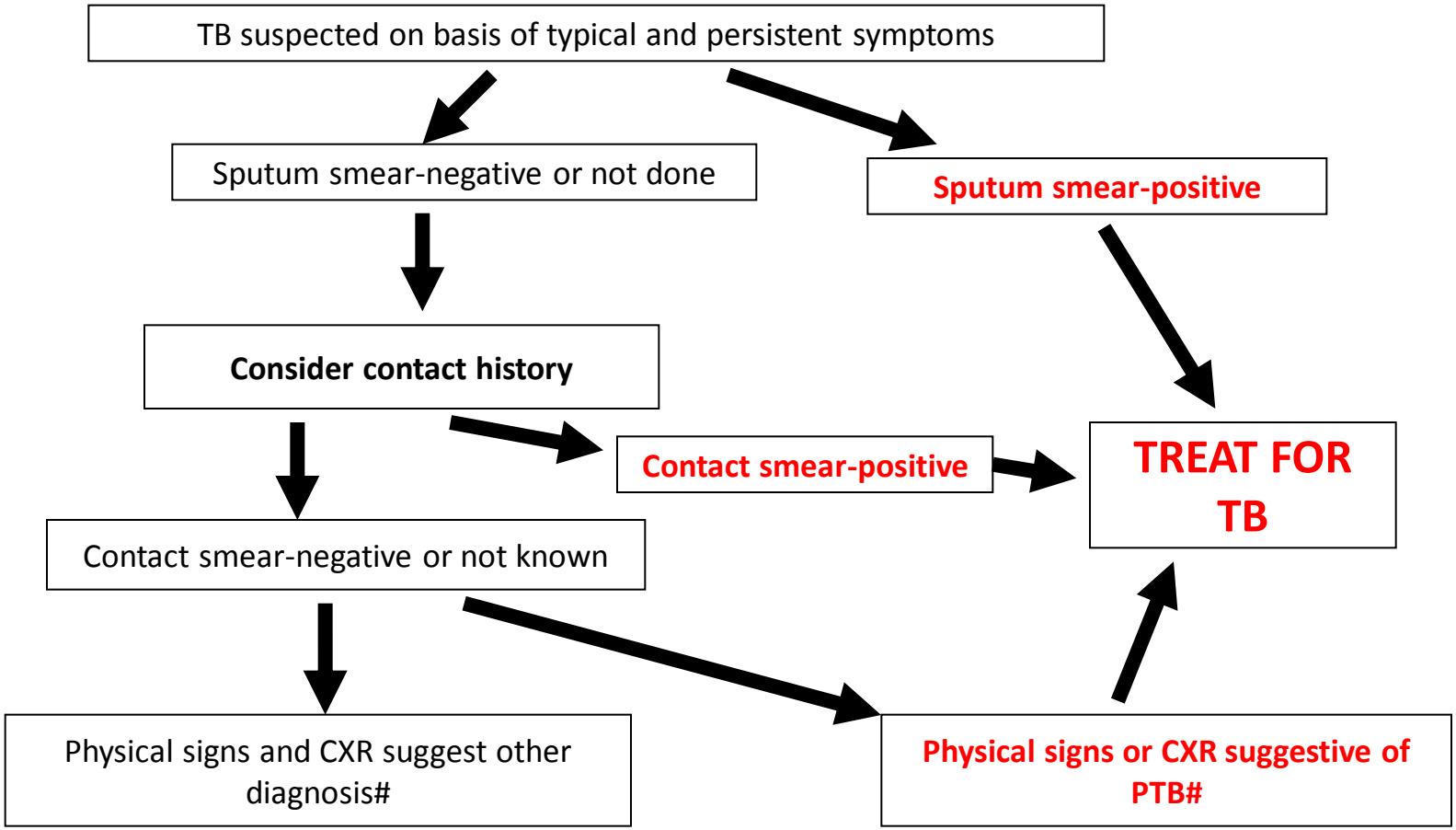
typical findings of straw coloured exudate with high protein and predominately lymphocytes
§ referral may be for investigation as well as clinical care. If referral not possible, start anti-TB treatment.

Approach to TB diagnosis in HIV-uninfected child



Decision for further outpatient review or inpatient management or referral will clearly depend on clinical state and available levels of care.

Approach to TB diagnosis in HIV-infected child



It can be difficult to clearly define what is “suggestive of PTB” on clinical or radiological findings in HIV-infected children because of clinical overlap between PTB and other forms of HIV-related lung disease: note further slides with Table and CXRs.

CXR abnormalities of PTB in HIV-infected children are mainly similar to those in HIV-uninfected children.

Clinical approach to TB diagnosis

Note that clinical assessment should include decision for hospitalisation or referral depending on severity of clinical signs or need for other appropriate management

INDICATIONS REQUIRING HOSPITALIZATION/REFERRAL

- Severe forms of PTB and EPTB for further investigation and initial management
- Severe malnutrition for nutritional rehabilitation
- Signs of severe pneumonia (i.e. chest in-drawing) or respiratory distress
- Other co-morbidities e.g. severe anaemia

Referral should also be considered if

- Diagnostic uncertainty requiring further investigation at referral level
- Necessary for HIV-related care e.g. to commence ART

Treatment of TB in children as outpatient

Drug dosages should be consistent with national guidelines

Children tolerate TB drugs well with low risk of toxicity

Treatment response is usually noted within 1-2 months of treatment – symptom resolution and weight gain*

Weight should be monitored during treatment and dosages adjusted accordingly

Adherence to the full course is a challenge especially continuation phase

Importance of supervision by parent/guardian and so they need to understand the importance of adherence and completing the full course

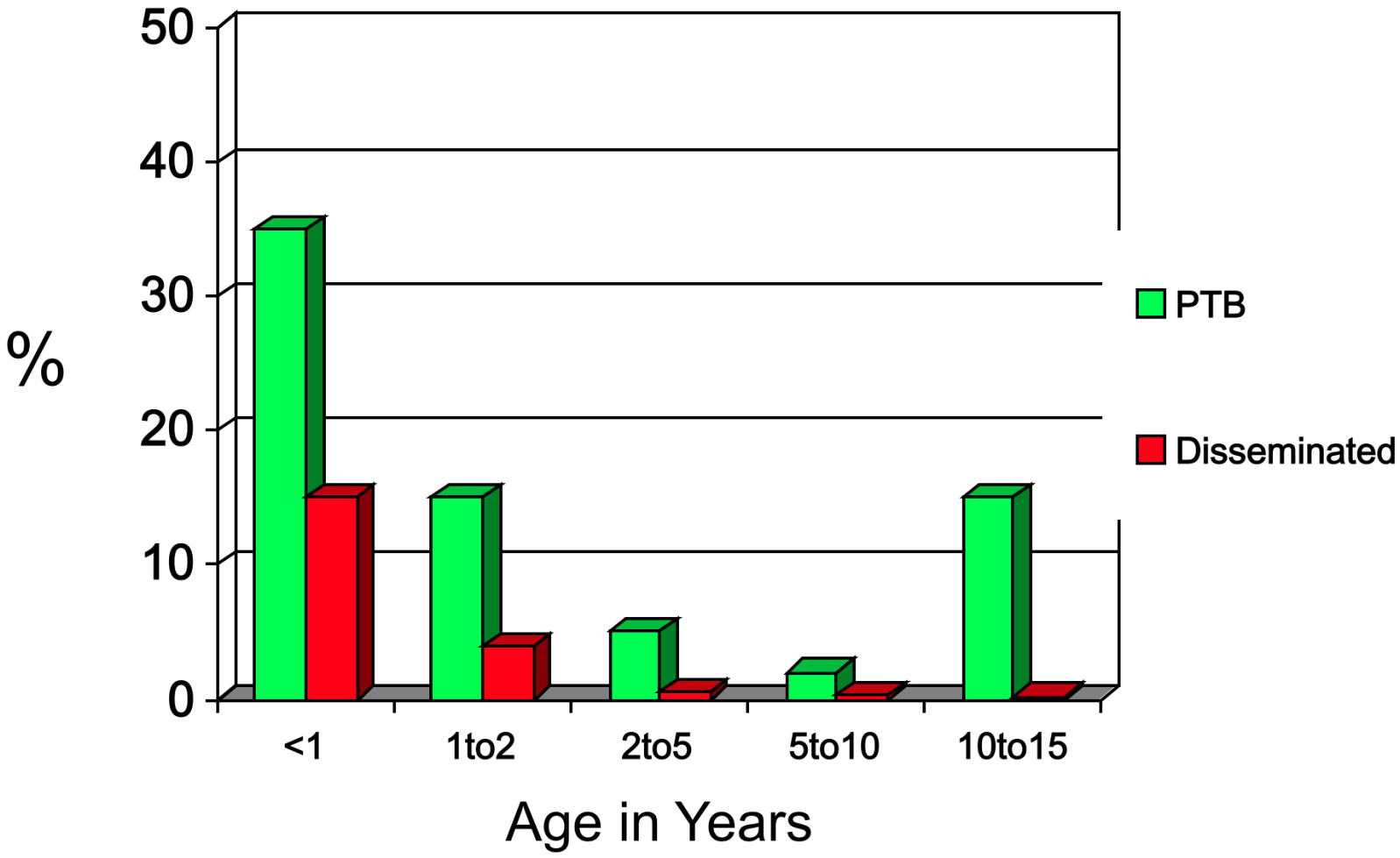
All children should registered with NTP: include age, TB type and outcome

* Note that lymph node enlargement often persists for months even with effective treatment

Community-based management of a child who is a household or close contact of an infectious case of TB

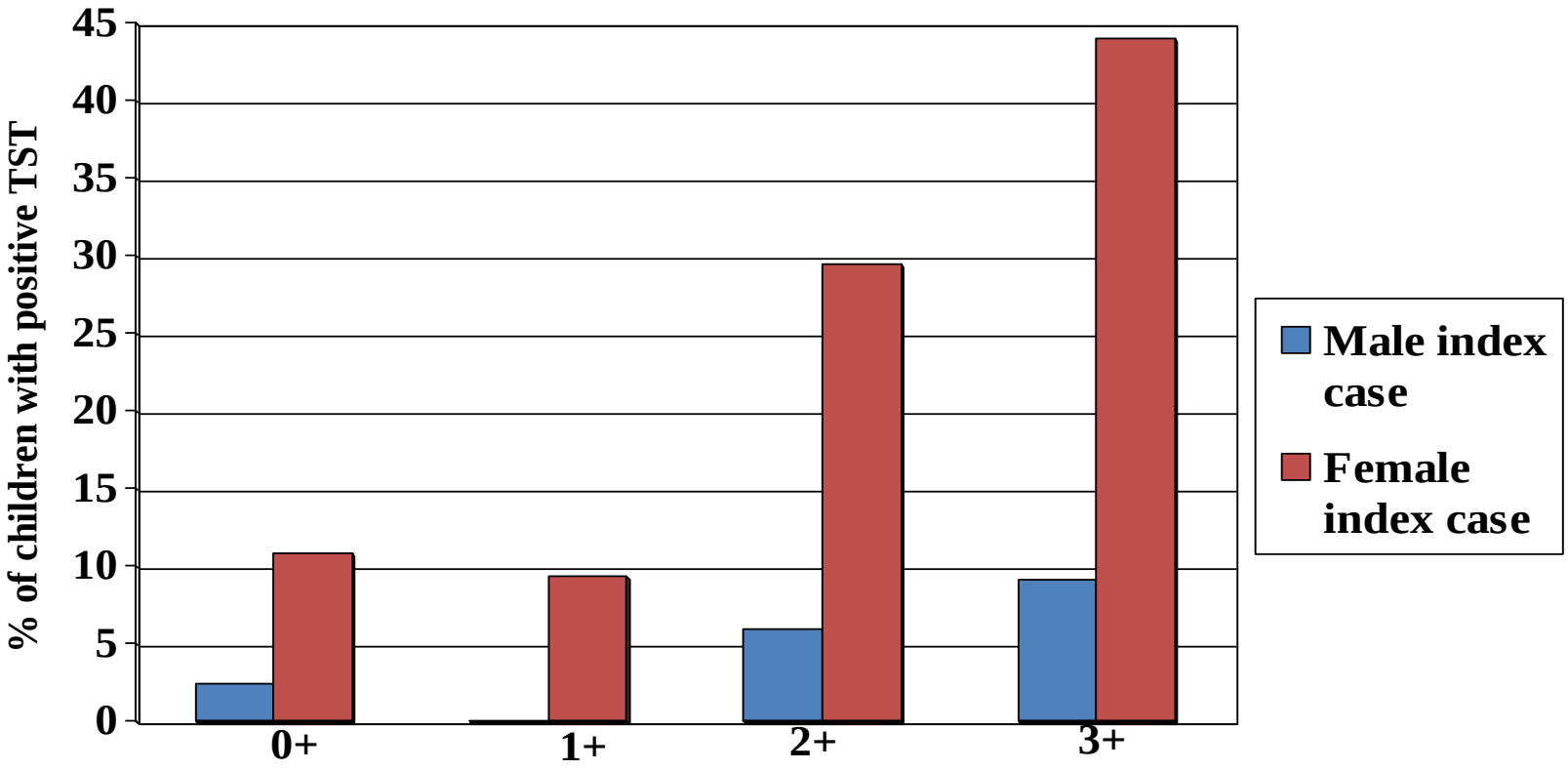
Available approaches to prevent TB in children	
Improved case-finding and management	Early identification and effective treatment of infectious TB cases will reduce the burden of child TB
BCG	Neonatal BCG immunisation is used widely but efficacy is variable The main proven benefit of neonatal BCG is protection against severe disseminated forms of TB in children
Contact screening and management	This has huge potential to reduce the burden of TB in children Focus is on individuals infected with TB that have greatest likelihood of developing active TB disease following infection – this includes infants, young children and HIV-infected children of any age Focus is on contacts of the most infectious cases, usually those with sputum smear-positive disease Widely recommended but uptake by families and implementation by NTP are poor

Risk of TB disease following infection by age



Proportion of children with TB infection (positive TST) by degree of smear positivity of the source case

Kenyon TA et al, Int J Tuberc Lung Dis 2002



Why is child contact screening important? Prevent child morbidity and mortality

- The prevalence of TB infection is high among child contacts

  R Triasih et al, J Trop Med 2012

- Children living in households with TB cases reported significant increase risk of all-cause mortality (66% higher) in Guinea-Bissau compared to children living in non-TB households in same community, especially if the mother had TB (8-fold increase risk of death)

  AF Gomes et al, Thorax 2011

- Missed opportunities for IPT are very common in children that later present with confirmed TB disease

  K Du Preez et al, Ann Trop Paediatr 2011

Why is contact screening important? Increased case-finding

- The prevalence of TB infection and disease is high among contacts

  J Morrison, et al. Lancet Infect Dis 2008

  - All TB cases 4.5% (95% CI 4.3-4.8)
  - Confirmed cases 2.3% (95% CI 2.1-2.5)
  - Latent TB infection 51.4% (95% CI 50.6-52.2)

- Malawi

  R Zachariah et al, Int J Tuberc Lung Dis 2003

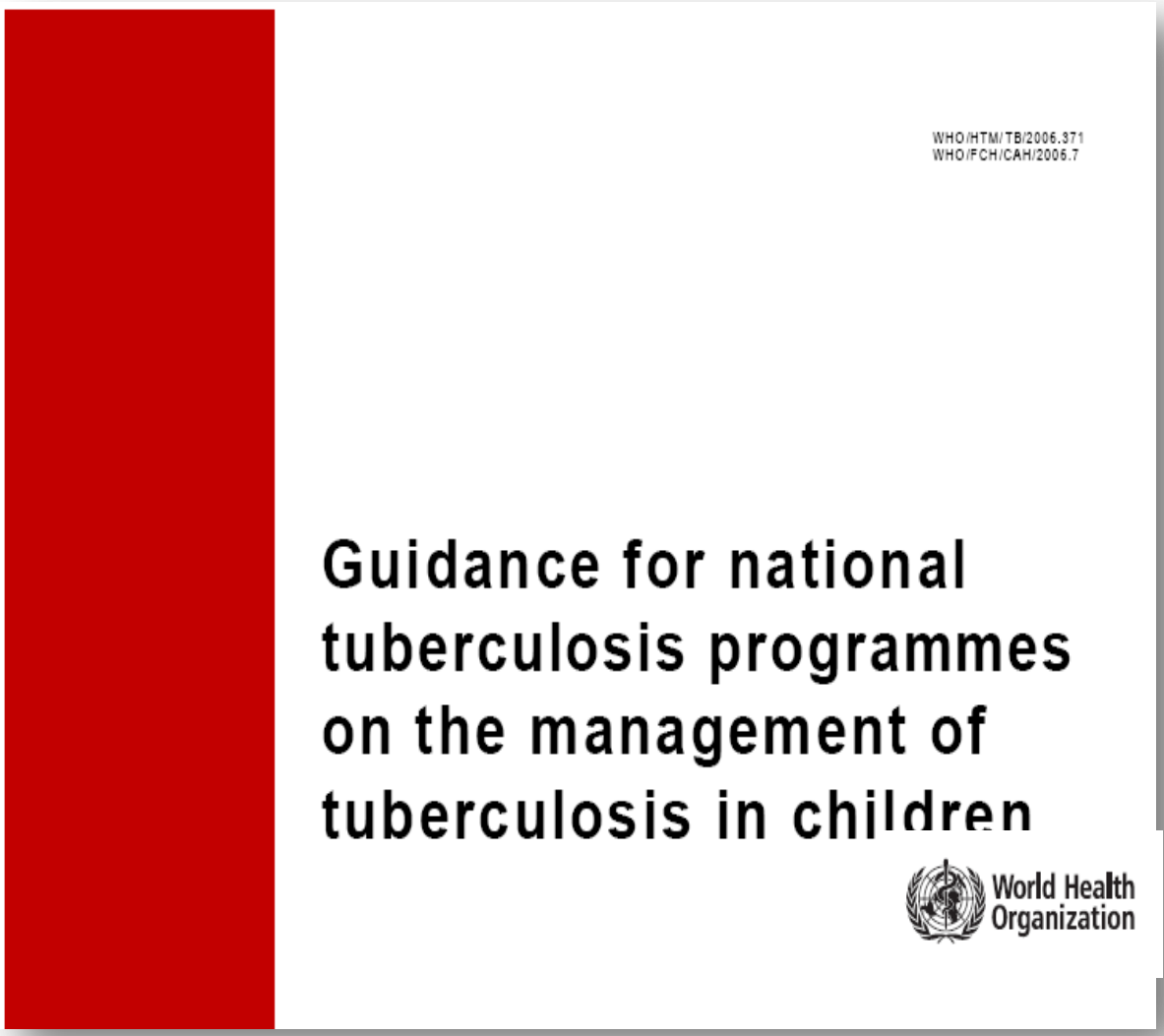
  - 189 TB cases (HIV prevalence 69%) and 985 household contacts
  - TB prevalence with active case finding among contacts (1.74%, 1735/100,000) was significantly higher than passive case finding 0.19% (191/100,000) - p=0.01

- The Gambia
  - Incidence of TB disease among contacts was 603 per 100,000 (95% CI 370-830)

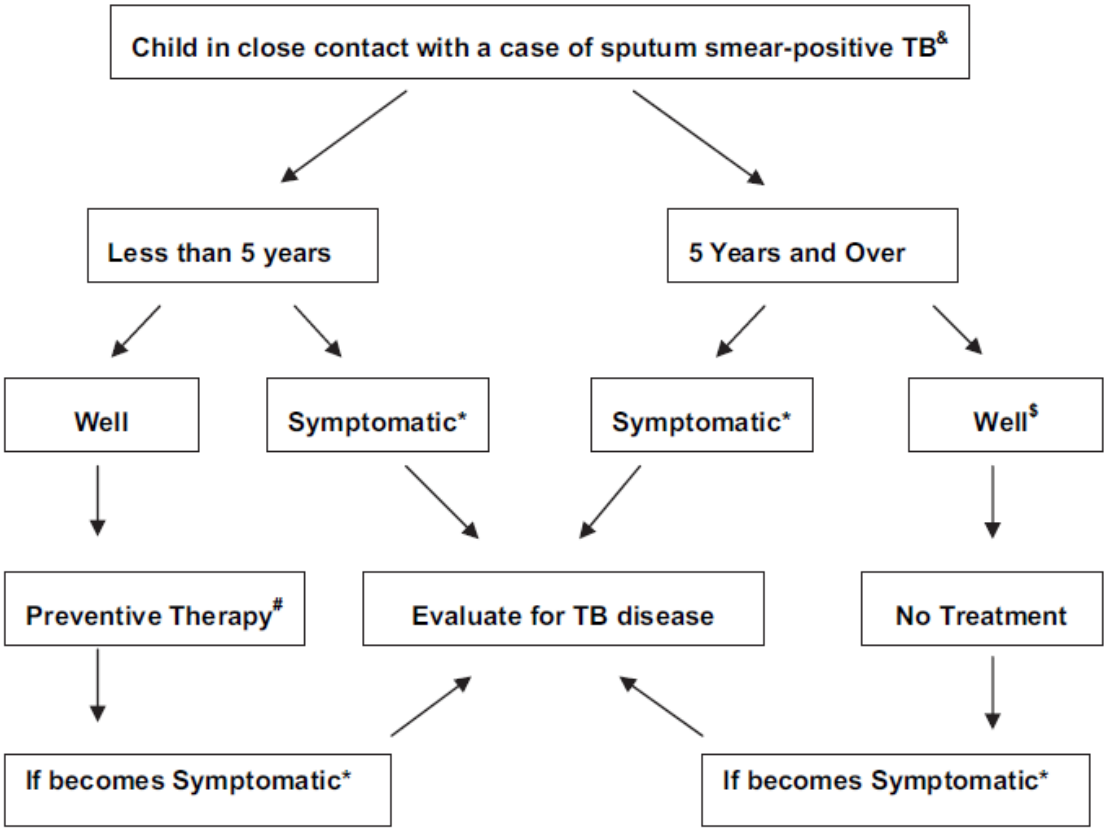
    PC Hill et al, PLoS ONE 2008
  - 33 TB cases identified from 2174 contacts of 317 adults with smear-positive PTB: prevalence of 1518 per 100,000

    D Jackson-Sillah et al, Trans R Soc Trop Med Hyg 2007

Symptom-based screening is also recommended in the WHO 2006 guidance



Symptom-based screening



&Also consider if the mother or primary caregiver has sputum smear-negative pulmonary TB

*Symptomatic: If TB is suspected, refer to local guidelines on diagnosis of childhood TB

Isoniazid 10/mg/kg daily for 6 months

$ Unless the child is HIV-infected (in which case isoniazid 10/mg/kg daily for 6 months is indicated)

Management of child contacts

- **Decentralise**: symptom-based screening provides opportunity to undertake an integrated family-based approach in the community around the source case receiving DOT rather than requiring referral to health facility for all cases

- **Adherence**: to IPT for 6 months is a challenge

- **Enhanced case-finding**: Note that symptom-based screening also aims to identify symptomatic contacts of any age for investigation for possible TB disease

Management of child contacts

Criteria for contacts to receive IPT

- No active TB disease – no symptoms suggestive of TB

  AND

- At high risk of disease following TB exposure
  - < 5 years
  - HIV-infected

Management of contacts	Response	Action
Symptomatic Sputum smear positive	TB treatment	Register
Symptomatic Sputum smear-negative or not available	Refer	Refer
Asymptomatic and high risk	IPT	IPT register
Asymptomatic and not high risk	No treatment	Advise to return if symptoms develop

Management of child contacts

List close contacts

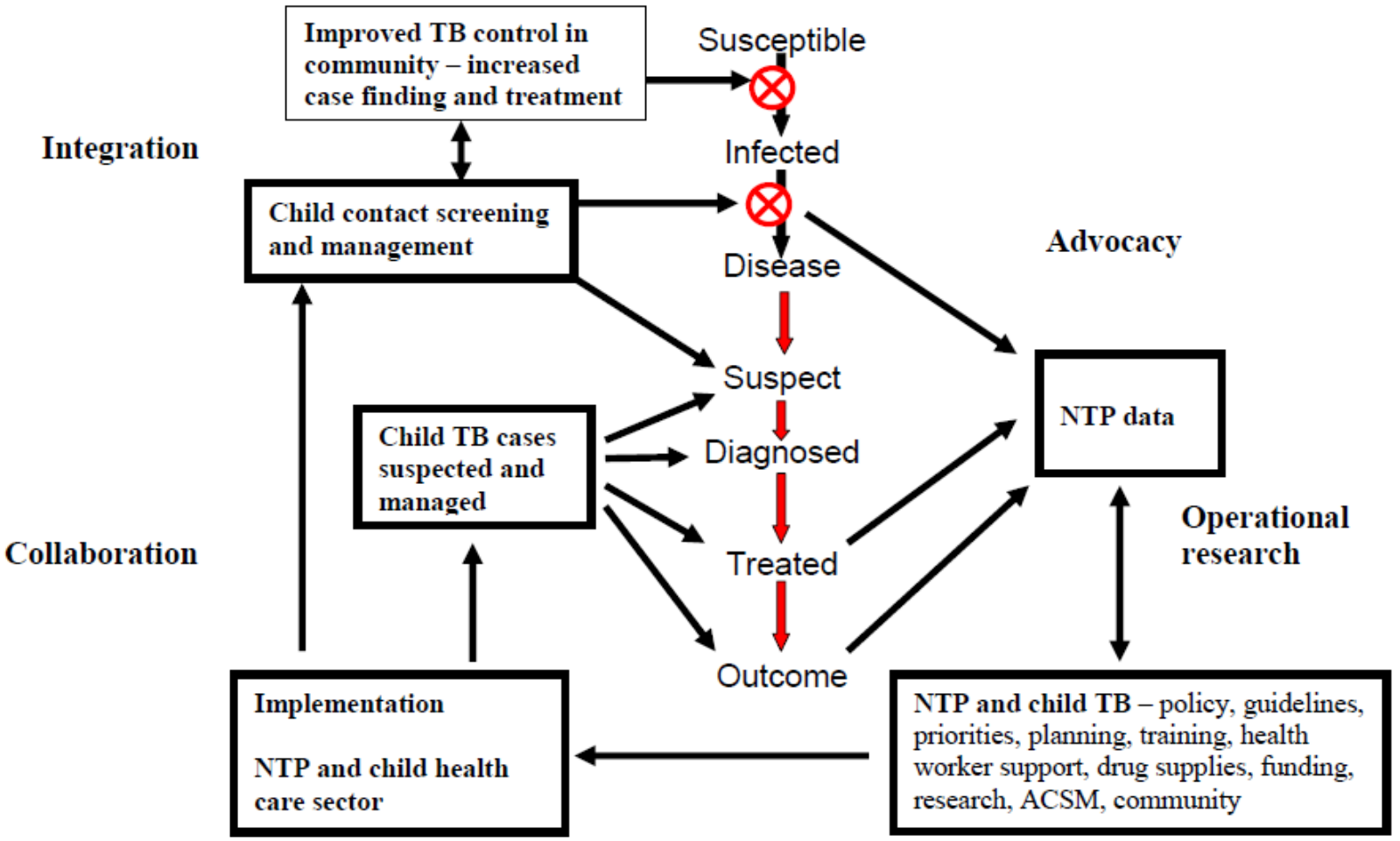
- What is the age of the contact?
- Is the contact HIV-infected?
- Does the contact have any symptoms suggestive of TB?

Checklist of main symptoms

- Persistent cough for more than 2 weeks
- Weight loss or failure to gain weight
- Persistent fever for more than 1 week and/or night sweats
- Fatigue, reduced playfulness, less active

Roadmap for TB in children

Figure. Interventions that target stages of the continuum in children from susceptibility to disease and outcome



" There are many contributions which the pediatrician can make to a TB control program.

First the negativism about tuberculosis so prevalent in pediatrics must be overcome…"

Edith Lincoln, 1961

FIGURE 1. Edith Lincoln at the commencement of her studies

Donald PR. Edith Lincoln, an American Pioneer of Childhood Tuberculosis. *Pediatr Infect Dis J* 2013