Introducing the 4-month regimen for children and adolescents with non-severe TB in Kenya: implementation experiences

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Committee of Experts for Child TB, Kenya NTLP

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Lorraine Mugambi-Nyaboga, CHS

Annual meeting of the Child and Adolescent TB Working Group.
14th November 2023. Paris, France
This is Kenya – Demographics, TB burden

Gobal TB Report 2022. No. of incident TB cases in top 30 countries globally.

Among top 30 TB burden countries in the world EIGHT ARE IN AFRICA, INCLUDING KENYA

Kenya TB case notification rate 2020. 251 (152-373) per 100,000

Demographic Characteristic | Detail
--- | ---
Population | 54 million
Median Age | 19 years
Life Expectancy | 63 years
Fertility rate | 3.2 live births per woman
Under 5 mortality rate | 36 per 1000

High level of TB in most counties in Kenya

Short-course child TB regimen-Kenya. Maleche-Obimbo 2023
TB in children and adolescents in Kenya
Highest hit age groups: children <5yr, older teenagers 15-19

In Kenya, highest no cases 0-5yr and 15-19yr old

10 high burden TB countries globally: highest no cases: U5yr and older teens
Pulmonary TB: 71% to 87%
Treatment success <15 yrs
All: 87.5%. HIV+: 80.9%
Death HIV neg: 1.4 (15yr+) to 5.3% (U5s)
Death HIV pos: 12.1 (15y+) to 14.0% (U5s)
5.1. Treatment shortening in children and adolescents with non-severe TB

Recommendation:
In children and adolescents between 3 months and 16 years of age with non-severe TB (without suspicion or evidence of MDR/RR-TB), a 4-month treatment regimen (2HRZE/2HR) should be used.

(Strong recommendation, moderate certainty of evidence)

Remarks
• Non-severe TB is defined as: Peripheral lymph node TB; intrathoracic lymph node TB without airway obstruction; uncomplicated TB pleural effusion or paucibacillary, non-cavitary disease, confined to one lobe of the lungs, and without a miliary pattern.
• Children and adolescents who do not meet the criteria for non-severe TB should receive the standard six-month treatment regimen (2HRZE/4HR), or recommended treatment regimens for severe forms of extrapulmonary TB.
• The use of ethambutol in the first two months of treatment is recommended in settings with a high prevalence of HIV,27 or of isoniazid resistance.27

https://www.who.int/health-topics/tuberculosis
Kenya National Committee of Experts (CoE) on Child-adolescent TB & Lung Disease: Driver of Adaptation

**National TB / Lung Program**
- Head NTLP
- Paed focal person (Dr)
- Commodity
- Laboratory
- M & E
- Logistics

**Academia - Universities**
- Paediatric Pulmonologist,
- Implementation Scientist
- Infectious Dx specialists

**Kenya Ministry of Health**
- National AIDS Program
- Division of Child/Adol Health

**Kenya Medical Research Institute**
- Researchers in Child TB (Paed IS)

**Development Partners**
- CHS-TB ARC (CHS)
- Global Fund
- WHO – TB focal person

Short-course child-TB regimen-Kenya, Maleche-Obimbo 2023
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**Adapted Kenya guideline**

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Half day meeting (on-site + virtual) Oct 2022

Presentation of the algorithm and proposed short-course TB treatment regimen to wider audience of stakeholders

- County representatives TB, TB-HIV
- Other MoH units – child health
- Faith based & Private Health Providers
- TB/lung Experts
- Patient communities, CSOs
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• Examined local relevant guidelines
• Adapted Kenya paediatric TB guidelines

Paediatricians from CoE, Academia
Prof Maleche-Obimbo (Pulmonologist)
Dr Jacquie Oliwa (Implementation scientist)
WHO guide: How to decide which child gets 4 vs 6 mth TB regimen:

**Box 5.3 Eligibility criteria for the 4-month regimen (2HRZ(E)/2HR) in children and adolescents aged between 3 months and 16 years with non-severe pulmonary or peripheral lymph node TB in various settings**

In children and adolescents who have undergone bacteriological testing and CXR, a 4-month treatment regimen should be started in children and adolescents meeting all of the following three criteria:

- CXR findings consistent with non-severe TB (CXR should ideally be done at baseline, but it can be performed at any point during the treatment course):
  - Intrathoracic lymph node TB without significant airway obstruction; or
  - PTB confined to one lobe with no cavities and no miliary pattern; or
  - Uncomplicated pleural effusion (without pneumothorax or empyema);
- TB that is negative, trace, very low or low using Xpert MTB/RIF or Ultra, or sputum smear-negative (if Xpert MTB/RIF or Ultra not available);
- The child or adolescent has mild TB symptoms that do not require hospitalization.³

**INVESTIGATIONS TO DECIDE (WHO 2022)**

**Chest x-ray**

*Ability to identify the following pathology in the child’s CXR....*

- Intrathoracic LN no airway compression
- Pleural effusion “uncomplicated”,
- No of lobes with pathology – one
- Rule out miliary pattern
- Be sure no cavitation

**Microbiologic tests**

*Ability to classify as...*

- “Paucibacillary” Xpert or ultra (trace, very low, low)
- Or bacteriologic negative by sputum smear or xpert
How useful was CXR for TB diagnosis in Children & Adolescents in Kenya?  
Kenya 2019 CXR Data

<table>
<thead>
<tr>
<th>Age group</th>
<th>Total Patients 2019</th>
<th>X-rays Done 2019</th>
<th>X-ray Uptake (%)</th>
<th>Positivity rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>5118</td>
<td>3380</td>
<td>66%</td>
<td>96%</td>
</tr>
<tr>
<td>5-9</td>
<td>1141</td>
<td>589</td>
<td>52%</td>
<td>94%</td>
</tr>
<tr>
<td>10-14</td>
<td>2057</td>
<td>851</td>
<td>41%</td>
<td>92%</td>
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<tr>
<td>15-24</td>
<td>15056</td>
<td>4039</td>
<td>27%</td>
<td>94%</td>
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<tr>
<td>25-34</td>
<td>21945</td>
<td>6329</td>
<td>29%</td>
<td>95%</td>
</tr>
<tr>
<td>35-44</td>
<td>18479</td>
<td>6058</td>
<td>33%</td>
<td>95%</td>
</tr>
<tr>
<td>45-54</td>
<td>10842</td>
<td>3953</td>
<td>36%</td>
<td>95%</td>
</tr>
<tr>
<td>55-64</td>
<td>5645</td>
<td>2309</td>
<td>41%</td>
<td>96%</td>
</tr>
<tr>
<td>65+</td>
<td>5537</td>
<td>2735</td>
<td>49%</td>
<td>97%</td>
</tr>
<tr>
<td>Overall</td>
<td>85820</td>
<td>30243</td>
<td>35%</td>
<td>95%</td>
</tr>
</tbody>
</table>

What % of children with presumed TB got CXR?
<br> <5 yrs: 66%
<br> 5 – 9 yrs: 52%
<br> 10 – 14 yrs: 41%

Half to one-third of children & adolescents <15 yr with presumed TB DID NOT HAVE CXR ACCESS. This may delay TB treatment decision
How useful was Xpert for TB diagnosis in Children & Adolescents in Kenya? 
Kenya 2019 Xpert Data

<table>
<thead>
<tr>
<th>Age group</th>
<th>Total Patients 2019</th>
<th>Xpers Done 2019</th>
<th>Xpert Uptake (%)</th>
<th>Positivity rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>5118</td>
<td>1103</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>5-9</td>
<td>1141</td>
<td>481</td>
<td>42%</td>
<td>34%</td>
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<td>10-14</td>
<td>2057</td>
<td>1126</td>
<td>55%</td>
<td>54%</td>
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<tr>
<td>15-24</td>
<td>15056</td>
<td>9770</td>
<td>65%</td>
<td>81%</td>
</tr>
<tr>
<td>25-34</td>
<td>21945</td>
<td>14658</td>
<td>67%</td>
<td>78%</td>
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<tr>
<td>35-44</td>
<td>18479</td>
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<td>67%</td>
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<td>45-54</td>
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<td>65%</td>
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<td>55-64</td>
<td>5645</td>
<td>3529</td>
<td>63%</td>
<td>56%</td>
</tr>
<tr>
<td>65+</td>
<td>5537</td>
<td>3389</td>
<td>61%</td>
<td>47%</td>
</tr>
<tr>
<td>Total</td>
<td>85820</td>
<td>53443</td>
<td>62%</td>
<td>71%</td>
</tr>
</tbody>
</table>

What % of children with presumed TB got an Xpert test?

- <5 yrs: 22%
- 5 – 9 yrs: 42%
- 10 – 14 yrs: 55%

50 to 80% of children & adolescents <15 yr with presumed TB NOT ABLE TO GET SPECIMEN TO XPERT LAB. MTB DETECTION LOW (14% BC overall). TB treatment decision based on clinical +/- CXR for majority
Classifying severe respiratory disease in child Kenya MoH paediatric protocols – IMCI/ETAT

Severe respiratory disease:
- Cyanosis, SPO2 <90%
- Chest wall indrawing
- Grunting, increased work of breathing

Other danger signs indicating severe illness:
- Unable to drink/breastfeed
- Drowsy/reduced consciousness (AVPU <A)
- Signs of shock
### Kenya 2023: Proposed treatment regimens for children 10 years and below

*All children 11 years and above will require the 6 month regimen*

<table>
<thead>
<tr>
<th>Type of TB</th>
<th>Eligibility for 4 month regimen</th>
<th>Eligibility for 6 month regimen</th>
<th>Eligible 12 month regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-severe Pulmonary TB</td>
<td>Stable enough to be managed as an outpatient</td>
<td>All hospitalised patients</td>
<td>TB Meningitis Osteo-articular TB</td>
</tr>
<tr>
<td>Peripheral LN TB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe Pulmonary TB</td>
<td></td>
<td>A sick child at diagnosis with any danger sign</td>
<td></td>
</tr>
<tr>
<td>Extra Pulmonary TB <em>(excluding TB meningitis, Osteoarticular and peripheral LN TB)</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe Pulmonary TB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extra Pulmonary TB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TB Meningitis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osteo-articular TB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peripheral LN TB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eligible 12 month regimen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicators of severity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stable enough to be managed as an outpatient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No danger signs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory danger signs:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In respiratory distress (oxygen saturation &lt;90%, cyanosis, grunting, chest in-drawing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immune status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is HIV negative, not severely malnourished, not immune suppressed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infants &lt; 1yr <em>(immature immune system)</em>, HIV positive, severe malnutrition, any immunosuppressed child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacteriologic status <em>(where available)</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacteriologically negative OR Clinically diagnosed TB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacteriologically confirmed Drug-susceptible TB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment regimen</td>
<td>4 month regimen: 2HRZE/2HR</td>
<td>6 month regimen: 2HRZE/4HR</td>
<td>12 month regimen 2HRZE/10HR</td>
</tr>
<tr>
<td>• If the child has known contact with a person with drug-resistant TB, this table does not apply.....</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Start the child on treatment as per the Drug-Resistant TB guidelines</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Short-course child TB regimen-Kenya. Maleche-Obimbo 2023
# Implementation Steps: Short-course TB regimens for children (& revised clinical diagnostic algorithm)

<table>
<thead>
<tr>
<th>Addendum to TB guidelines</th>
<th>Endorsement by TB Interagency Coordinating Committee</th>
<th>Sensitisation &amp; Dissemination Professional Societies via Conferences, Webinars</th>
<th>Piloting new algorithm Training HCWs Launch &amp; Roll-Out Country-wide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revise tools, training material</td>
<td>Workshops Q4 2022 to Q2 2023</td>
<td>Conferences, webinars Q4 2022 to Q4 2023</td>
<td>Conferences, webinars Q4 2022 to Q2 2023</td>
</tr>
<tr>
<td>Commodity planning</td>
<td>Meeting Nov 2022</td>
<td></td>
<td>Launch &amp; Roll out Q4 2023</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pilot Q4 2022 to Q2 2023</td>
</tr>
</tbody>
</table>

- Incorporate input from the COE/stakeholder forum to the algorithm and regimen proposals
- Draft an addendum to the current guidelines
- Review reporting tools
- Develop training material for sensitisation and dissemination
- Commodity planning

- Endorsement by the TB ICC
- Adoption of the guideline addendum & revised tools
- Respiratory Society of Kenya - November 2022 (400)
- Pan-African Thoracic Society - June 2023 (500)
- Paediatric Association Congress – April 2022 (500)
- Infectious Disease Society Conference – October 2023 (600) **TOTAL: 2000 pax**

- Pilot diagnostic algorithm selected counties Q4 2022 – Q2 2023
- Lessons used to fine-tune tools. CoE final review Q3 2023
- Trainer of trainers, cascade to health teams country-wide
- Official launch, nationwide awareness Nov 2023
- **Roll out of the shorter regimen December 2023**

Short-course child TB regimen-Kenya. Maleche-Obimbo 2023
A Call to ACTION!
It’s time to WIN THE BATTLE and END TB in children and adolescents!!

Courtesy of NTLP. FAQs child TB. [www.chskenya.org](http://www.chskenya.org)
Acknowledgements & Appreciation

To the guidelines adaptation team

Special appreciation
Kenya NTLP team
• Dr Jacqueline Kisia
• Dr Immaculate Kathure
• Ms Druscilla Nyaboke (M&E)

CHS TB-ARC
Dr Lorraine Mugambi-Nyaboga
Dr Irungu Karuga

University of Nairobi/KEMRI
Dr Jacqueline Oliwa

Thank you! Asanteni! Merci! Gracias! Obrigado!

Short-course child TB regimen-Kenya. Maleche-Obimbo 2023

• Courtesy of NTLP. FAQs child TB. www.chskenya.org
SUPPLEMENTAL SLIDES
Kenya child TB diagnostic algorithm 2022

**Kenya decision**

- Strengthen existing diagnostic approaches.
- Empower Health Care Workers to make clinical diagnosis in children, and make TB treatment decision.
- Recognise that TB progresses faster and is more severe in children.
Kenya simplified algorithm for diagnosis of PTB in children <15yr

MINISTRY OF HEALTH
SIMPIFIED ALGORITHM FOR THE DIAGNOSIS OF PULMONARY TUBERCULOSIS IN CHILDREN AGE 15 YEARS AND BELOW

Does the child have presence of **TWO OR MORE** of the following symptoms suggestive of TB?

- Cough for >2 weeks
- Persistent fever and/or night sweats >2 weeks
- Weight loss or poor weight gain
- Fatigue (lethargy), reduced playfulness, less active >2 weeks

Enquire for positive contact history with a person with TB or person with a chronic cough.

On physical examination does the child have any of the following:

- Abnormal respiratory exam (any of the following signs)
  - Increased respiratory rate (age 2-12months >50/min. 1-5yr >40/min. 6-10yr >30/min. 11-14yr >25/min)
  - Respiratory distress (flaring, chest indrawing)
  - Wheeze or crepitations or asymmetry of findings
  - Oxygen saturation <95% or cyanosis

- High temperature >37.2℃
- Check growth curve, weight, compare to previous weight

Additional Information

- Symptoms suggestive of TB can be common in children under 5 years old
- It is important to consider TB in the differential diagnosis of children with respiratory symptoms
- TB can manifest with a wide range of symptoms

Two or more symptoms (Box 1)
Abnormal respiratory exam findings

This is **probable (presumptive)** TB

Investigations for TB available?

Yes

Short-course child TB regimen-Kenya. Maleche-Obimbo 2023
Kenya Simplified diagnostic algorithm for Pulmonary TB in children <15 yr

**CLINICAL DIAGNOSIS OF PTB**
Does the child have presence of **TWO OR MORE** of the following symptoms?
- Cough for >2 weeks
- Persistent fever and/or night sweats >2 weeks
- Weight loss or poor weight gain
- Fatigue (lethargy), reduced playfulness, less active >2 weeks

**PLUS**
Presence of **ANY ONE** of the following:
- Positive history of contact with a person with TB in the last 12 months
- Abnormal Respiratory exam
- Abnormal CXR suggestive of PTB (where available)
- Positive Mantoux or IGRA test (where available)

**MAKE A CLINICAL DIAGNOSIS OF TB. START TB TREATMENT**

If test is Negative or not done:
- Give the child antibiotics for 1 week and ask them to return for reassessment after a week.

If test is Positive:
- On reassessment of the child after 1 week, if symptoms persist, re-evaluate and send for CXR if not previously done. If CXR is not accessible and symptoms have persisted consider clinical diagnosis of TB.

**BACTEROIOLOGICALLY CONFIRMED TB. START TB TREATMENT**

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Short-course child TB regimen-Kenya. Maleche-Obimbo 2023
Simplified Algorithm for the Diagnosis of Pulmonary TB in Children Age ≤ 14 years. Kenya 2023

**Presence of TWO or more of the following symptoms...**

- Cough > 2 weeks (or wheeze, fast breathing, DIB)
- Weight loss or poor weight gain
- Persistent fever and/or night sweats > 2 weeks
- Fatigue, reduced playfulness, less active > 2 weeks

**PLUS**

**Presence of any ONE of the following...**

- Positive contact history with person with TB or chronic cough in past 12 months
- Abnormal Respiratory exam (tachypnoea, wheeze/creps, resp distress, SPO2 <95%)
- CXR suggestive of PTB (where available)
- Positive Mantoux or IGRA test (where available)

**MAKE A CLINICAL DIAGNOSIS OF PTB, START TB TREATMENT**