Systematic screening for TB disease

Updated WHO recommendations and operational guidance for people living with HIV

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Global TB Programme, WHO

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Update to the WHO tuberculosis screening guidelines
Systematic screening for TB disease

“The systematic identification of people at risk for TB disease, in a pre-determined target group, by assessing symptoms and using tests, examinations, or other procedures that can be applied rapidly.”

Key features:

• Should be done systematically in a selected population
• Should be done using a highly sensitive tool to distinguish people with a higher probability of TB
• Should be followed with a diagnostic evaluation using a test with high accuracy to confirm a diagnosis
• Should follow ethical principles specific to screening
Role of TB screening for people with HIV

- **Large burden of disease and mortality due to TB** among people living with HIV
  - People living with HIV are more vulnerable to TB and to rapid progression from infection to disease and to death
  - TB is a primary cause of AIDS-related death among people with HIV

- **Large TB detection gap** among people living with HIV
  - An estimated 44% of people living with HIV-associated TB are not diagnosed

- Therefore **early detection and treatment are essential** to reducing mortality among people living with HIV

- **Screening for TB disease is an essential first step** prior to initiating TB preventive treatment (TPT) as well as providing other care, including the package of care for people with advanced HIV disease
TB screening guidelines – Updated 2021

**Goals of update:**

- Consolidate and update recommendations to bring them in line with most recent evidence,
- Evaluate novel screening tools and technologies
- Provide implementation guidance, including algorithms, for screening specific risk groups

**New guidelines and operational guide:**

- Released for World TB Day, March 2021
- Available at: https://www.who.int/activities/screening-for-tb
Systematic screening for TB disease is strongly recommended among:

- Household and close contacts of people with TB
- People living with HIV
- Miners exposed to silica dust
- Prisoners

For these populations:

- Screening should always be conducted
- Question is how – what tools and algorithms, implementation model, frequency
- TPT should be provided when appropriate
- Monitoring and evaluation should be conducted to assess outcomes of screening and continually inform questions of implementation
Recommendations

**Populations to be screened**

Systematic screening for TB disease is *conditionally recommended among*:

- People with risk factors for TB seeking healthcare, in settings with \( \geq 0.1\% \) TB prevalence
  - Malnourishment, diabetes, chronic lung disease, history of previous TB, and others
- People with untreated fibrotic lesions on chest x-ray
- Populations with structural risk factors for TB and limited access to health care
  - Urban poor, homeless, refugees, migrants, other vulnerable or marginalized groups
- General population in settings with \( \geq 0.5\% \) TB prevalence

For these populations, consideration should be given to:

- Weighing the benefits and risks of screening
- Considering opportunity costs for other TB and health interventions
- Prioritizing risk groups that represent the greatest burden or have the greatest vulnerability in a particular setting
**Recommendations**

**Tools for screening people living with HIV**

The following tools are recommended for screening people living with HIV (for adults and adolescents 10 years and older)

- **WHO-recommended 4 symptom screen**
  - Cough
  - Fever
  - Night sweats
  - Weight loss

  - Recommended since 2011 for screening all PLHIV at every healthcare visit
  - Remains the most feasible screening test
  - Has limited accuracy in some subgroups, hampering implementation

<table>
<thead>
<tr>
<th>Population</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All people living with HIV</td>
<td>83</td>
<td>38</td>
</tr>
<tr>
<td>Inpatients</td>
<td>96</td>
<td>11</td>
</tr>
<tr>
<td>Outpatients on ART</td>
<td>53</td>
<td>70</td>
</tr>
<tr>
<td>Outpatients not on ART</td>
<td>84</td>
<td>37</td>
</tr>
<tr>
<td>≤ 200 CD4 cells/µL$^a$</td>
<td>86</td>
<td>30</td>
</tr>
<tr>
<td>Pregnant women living with HIV</td>
<td>61</td>
<td>58</td>
</tr>
</tbody>
</table>
**Recommendations**

**Tools for screening people living with HIV**

The following tools are recommended for screening people living with HIV (for adults and adolescents 10 years and older)

- **C-Reactive Protein**

  - A general marker for inflammation, can be performed as a point-of-care test in some settings
  - Has similar sensitivity and similar or improved specificity to W4SS in all subgroups of PLHIV, depending on cut-off
  - Represents an improvement in accuracy (particularly specificity) over the W4SS for people living with HIV not on ART

<table>
<thead>
<tr>
<th>Population</th>
<th>Cut-off &gt; 5 mg/L</th>
<th>Cut-off &gt; 10 mg/L</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Sensitivity (%)</td>
<td>Specificity (%)</td>
</tr>
<tr>
<td>All people living with HIV</td>
<td>90</td>
<td>50</td>
</tr>
<tr>
<td>Inpatients</td>
<td>98</td>
<td>12</td>
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<tr>
<td>Outpatients on ART</td>
<td>40</td>
<td>80</td>
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<tr>
<td>Outpatients not on ART</td>
<td>89</td>
<td>54</td>
</tr>
<tr>
<td>≤ 200 CD4 cells/μL</td>
<td>93</td>
<td>40</td>
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<td>Pregnant women living with HIV</td>
<td>70</td>
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Recommendations

Tools for screening people living with HIV

The following tools are recommended for screening people living with HIV (for adults and adolescents 10 years and older)

- Chest X-ray

- CXR used alongside W4SS increases sensitivity of screening, to help detect TB and rule out prior to TPT
- CXR and W4SS combined (parallel screen) provides improved sensitivity and similar specificity to W4SS alone for all subgroups of PLHIV
- Most sensitive screening strategy for PLHIV on ART

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<td>7</td>
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<td>33</td>
</tr>
<tr>
<td>Outpatients not on ART</td>
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<td>19</td>
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<td>14</td>
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<td>56</td>
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Recommendations

Tools for screening people living with HIV

Computer-aided detection (CAD) for automated interpretation of chest X-ray is now recommended as an alternative to human interpretation for TB screening and triage for all adults aged 15 years and older – INCLUDING people living with HIV

Landscape of CAD software - https://www.ai4hlth.org/
CAD for TB detection - https://tdr.who.int/activities/calibrating-computer-aided-detection-for-tb
Recommendations

Tools for screening people living with HIV

The following tools are recommended for screening people living with HIV (for adults and adolescents 10 years and older)

- **Molecular WHO-recommended rapid diagnostic tests**

  - **Strongly recommended** for medical inpatients with HIV in high-burden settings (medical wards with a TB prevalence of ≥ 10%) as a “screen and treat” strategy, no need for further diagnostic testing
  - **Conditionally recommended** for all other people living with HIV

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<tr>
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Recommendations

Tools for screening children living with HIV

- Two groups of children in whom TB screening is strongly recommended
  - Child contacts of TB patients
  - Children living with HIV

- Tools strongly recommended for screening children living with HIV (up to 10 years)
  - Symptom screening (cough, fever, weight loss)
  - And/or contact with TB patient
Adults and adolescents living with HIV
Single screening algorithms – W4SS, CRP, CXR
Adults and adolescents living with HIV
Single screening algorithms - mWRDs
Adults and adolescents living with HIV
Algorithms with W4SS and CRP
Adults and adolescents living with HIV

Algorithms with W4SS and CXR
Children living with HIV < 10 years
Screening with symptoms
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TAG, civil society
USAID
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