TB diagnostics for children
Research and development
Dr Nazir Ismail, Diagnostics Team Lead: WHO/GTB
ismailn@who.int
(i) 40 million people with TB to be reached with care during the period 2018 and 2023, including 3.5 million children and 1.5 million people with drug-resistant TB, including 115,000 children with DR-TB; and,

(ii) At least 30 million people to be reached with TB prevention services during the period 2018-2023 including 4 million children under 5 years of age, 20 million other household contacts and 6 million people living with HIV (including children).
Progress against UNGA HLM targets

Case detection and treatment

1 040 000 children notified with TB in 2018 and 2019

30% of the 2022 target (3.5m)

8 984 children started on second-line treatment for MDR/RR-TB in 2018 and 2019

7.8% of the 2022 target (115 000)

https://undocs.org/en/A/75/236
Case detection and treatment

1 040 000 children notified with TB in 2018 and 2019

30% of the 2022 target (3.5m)

8 984 children started on second-line treatment for MDR/RR-TB in 2018 and 2019

7.8% of the 2022 target (115 000)

Pillar 1 A of End TB Strategy

Bacteriological confirmation is an important issue

- Visible when looking at the numbers for All TB vs MDR/RR-TB

https://undocs.org/en/A/75/236
Specific diagnostic challenges for children

- Paucibacillary disease
- Sample collection in smaller children
Direct diagnostic challenges

Specific diagnostic **challenges**

- Paucibacilliary disease state
- Sample collection in smaller children

Possible **solutions**

- Use of newer more sensitive and rapid technologies
  - WHO policy exists (adopt) (Xpert, TrueNat, LPAfl/sl)
  - Implementation limited: ↑ fun
- Alternative specimen types: NPA, stool, urine
  - WHO policy exists (POC U-LAM and Xpert, adopt and implement)
  - Evidence using combination sample types lacking
Direct diagnostic challenges

Specific diagnostic challenges

• Paucibacillary disease state

• Sample collection in smaller children

Future Needs

• New generation technologies
  - More sensitive LAM type assay
  - Protein/mRNA signatures
  - Biomerieux/Cepheid/QuantumDx

• Child friendly(er) specimen types:
  - Saliva or finger prick tests
  - Breath tests
  - Skin patches
Specific diagnostic challenges for children

- Paucibacilliary disease
- Sample collection in smaller children

Case finding

- Test Access
- Screening
  - Health facility
  - Household (and other) close contacts

All children **start here**...

- Contact of someone

![Figure 1. Pathway through TB exposure, infection and disease (26, 27)](https://apps.who.int/iris/bitstream/handle/10665/275422/9789241514798-eng.pdf?ua=1)
**Indirect diagnostic challenges**

**Case finding challenges**
- Test Access
- Screening
  - Health facility
  - Household (and other) close contacts

**Possible solutions**
- Scale up new technologies
  - Near patient tools (TrueNAT, Xpert (Omni) & POC U-LAM)
  - Diagnostic mapping to ↑ access
    - Social support, transport, etc.
- Need new approaches
  - CAD development for children
  - Skin tests that are more specific for TB
  - Reflex testing algorithms for contacts
**Indirect diagnostic challenges**

**Case finding challenges**
- Test Access
- Screening
  - Health facility
  - Household (and other) close contacts

**Future needs**
- Patient centric solutions
  - Non sputum based point of care rapid tests
  - Paediatric specific TPP
- Need new approaches
  - Digital tools and apps that can risk stratify and identify contacts
  - Predictive biomarkers
• Huge gap between diagnosed and estimated burden among children
• Direct diagnostic challenges can be addressed by
  • Scaling up WHO existing policies and using alternative sample types
• Indirect diagnostic challenges require
  • A move towards near patient technologies and optimised networks
• Future needs include new generation technologies, simpler sample types and predictive markers
• Increased funding and technical assistance to support
  • adoption of new tools as they become available
  • R&D and implementation science to improve the diagnostic landscape
Thank You