TB diagnostics for children Research and development

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Political declaration UNGA HLM on TB – targets

(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

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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

Case finding

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

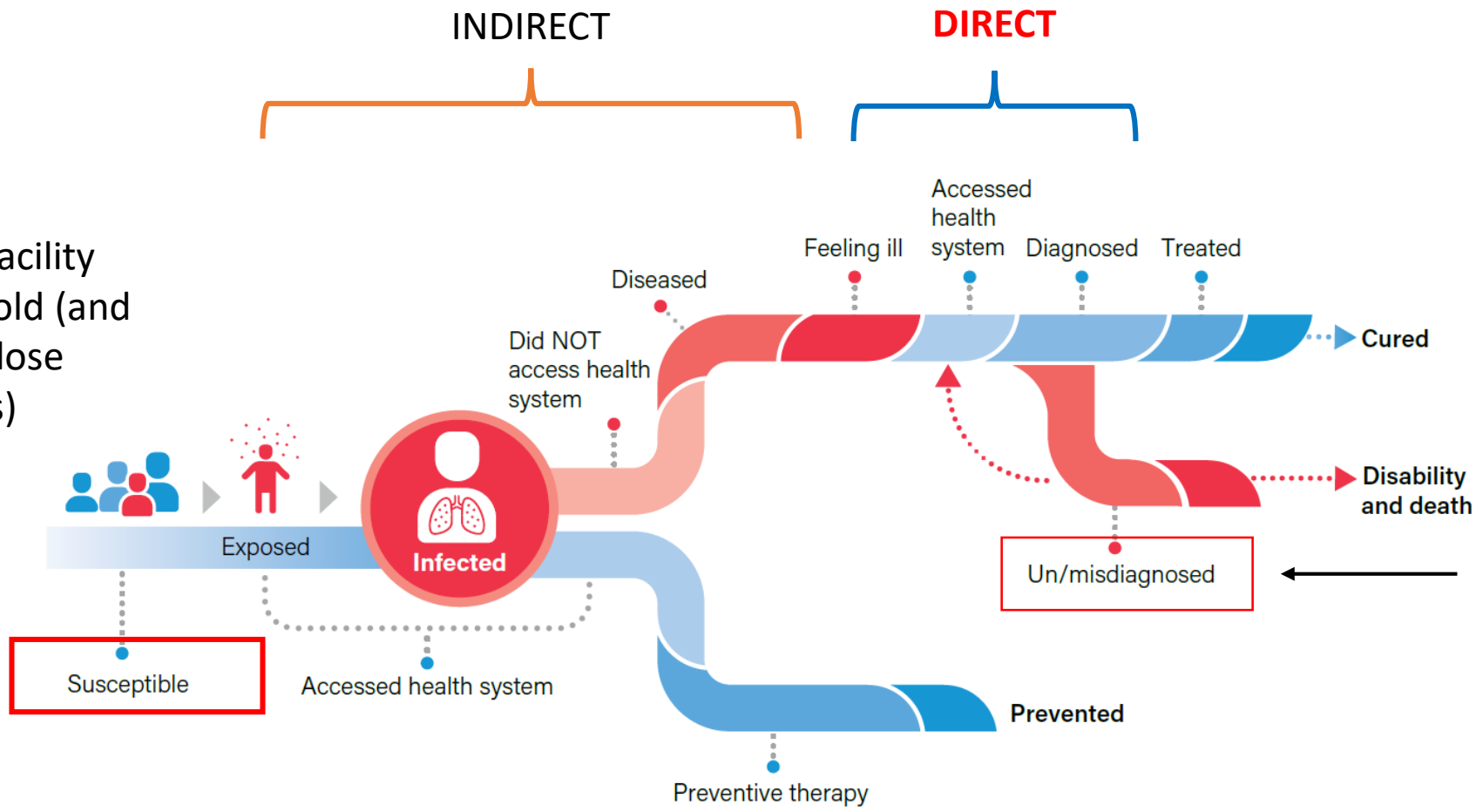


Figure 1. Pathway through TB exposure, infection and disease *(26, 27)*

All children **start here**…

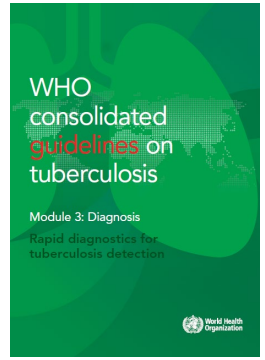
- Contact of someone

Specific **diagnostic** challenges for children

- Paucibacilliary disease
- Sample collection in smaller children

https://apps.who.int/iris/bitstream/handle/10665/275422/9789241514798-eng.pdf?ua=1

Direct diagnostic challenges

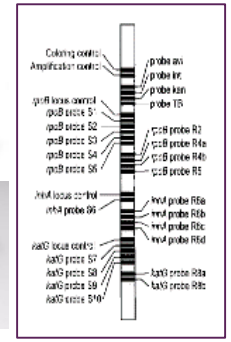


Specific diagnostic **challenges**

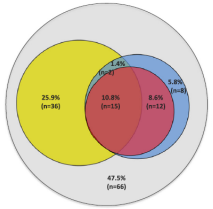
- Paucibacilliary disease state
- Sample collection in smaller children

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
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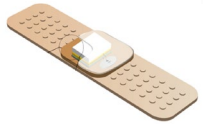
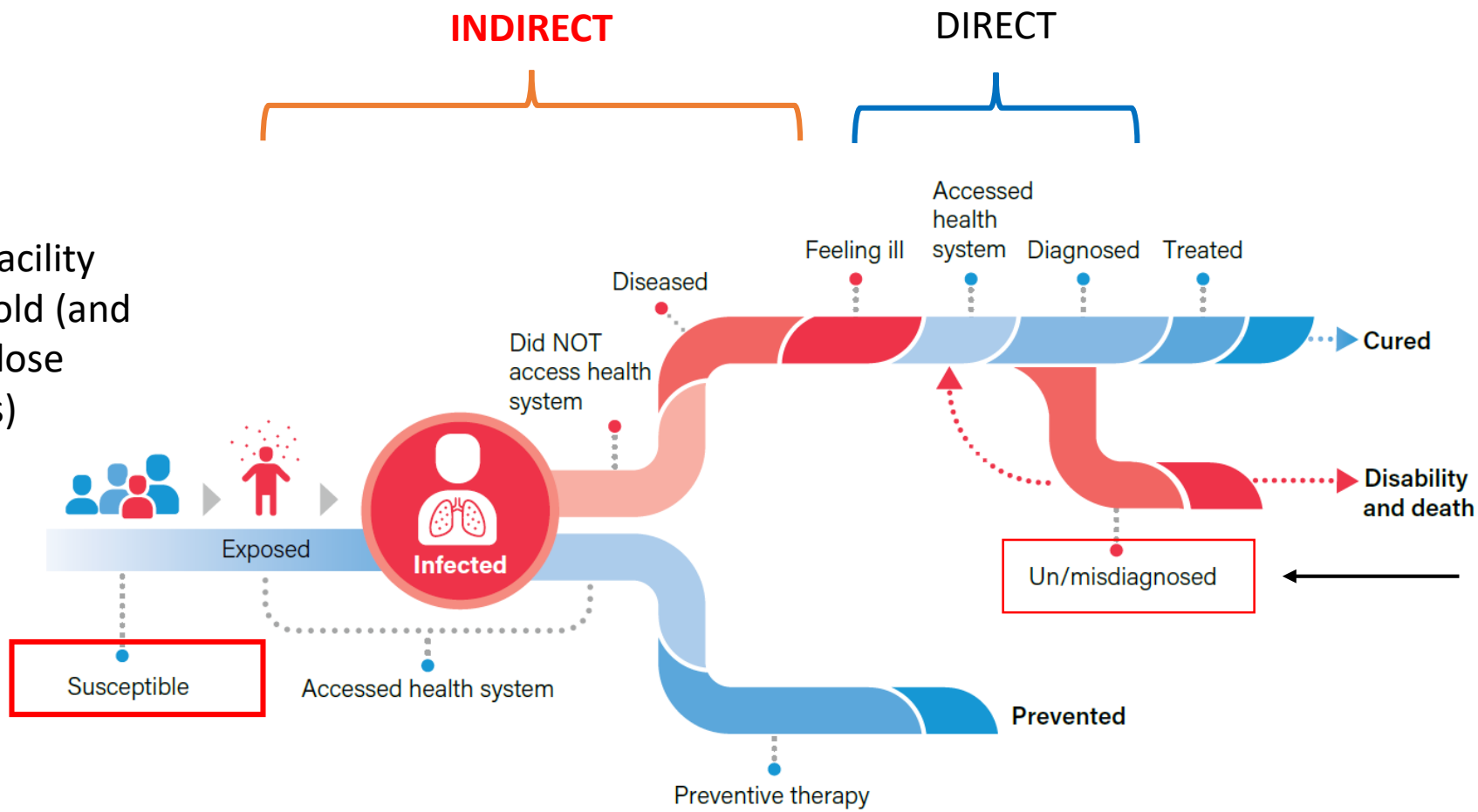
Future Needs

- 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



Case finding

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



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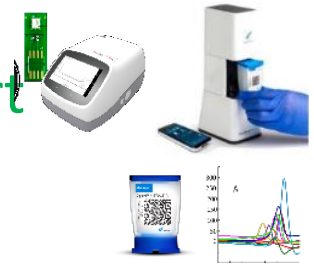
Indirect diagnostic challenges

Case finding **challenges**

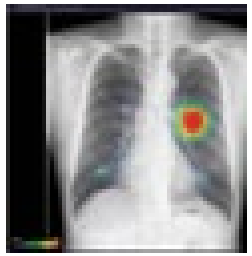
- Test Access
- Screening
  - Health facility
  - Household (and other) close contacts)

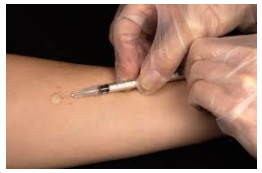
Possible **solutions**

- 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**

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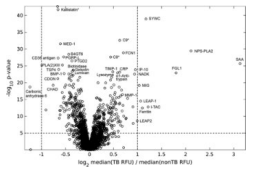
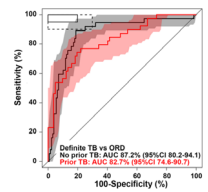
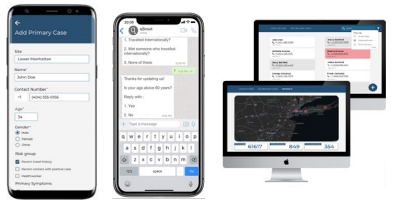
<u>Future needs</u>

- 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







Conclusion

- 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

World Health Organization

Thank You

END TB