Networks for Optimized Diagnosis to End TB: what is it and what can it do?
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Laboratory network optimization to improve service delivery for TB. 31st October,
The 50th Union World Conference on Lung Health, Hyderabad, India
Gaps in access and efficiency of diagnostic services

24% patients with TB initiated care seeking in a health facility with diagnostic capacity¹

66% patients sought care in private sector where diagnostic capacity is even lower¹

- Where testing capacity is available, it is often under-utilized and of variable quality.
- Significant investments made, but largely focused on device procurement.

How do we increase patient access to quality diagnosis while improving service delivery efficiency?

### TODAY

Geographic spread – e.g. 1 instrument per district or region

Based on current case notification data

Siloed approach to planning
- Laboratory testing only (not screening, CXR etc.)
- Not integrated with other disease programme planning, e.g. ACF
- No or limited integration across diseases

### VISION

Diagnostic services made available where patients seek care
- Either on-site or via efficient referral mechanism

Location of diagnostic capacity determined by demand for testing
- Current and estimated future demand to find the “missing cases”

Integrated planning along the whole patient cascade – screen>Dx>DST>Rx
Diagnostics network design and optimization

Aim of network optimization is to inform: instrument placement, sample transportation and referral mechanisms, staffing, geographical prioritization, quality assurance and integration of testing to meet the priority needs of the TB programme.

Objectives

- Map TB burden and current demand for TB diagnostic services
- Map current TB diagnostic network structure
- Identify the extent and distribution of gaps in services
- Develop a set of diagnostic network designs defined by NTP and partners that better and more efficiently reach “missing” TB cases (unmet demand) using existing infrastructure
- Model a set of new network paradigms, including new product and/or services investment, to inform government strategic planning and budgeting processes
Diagnostic network modelling & optimization process

Define Scope & set objectives

Collect data
routine programmatic and survey data in multiple formats

Build Baseline
to visualize and understand current network

Run customized scenarios
to understand areas for improvement and analyze trade-offs

Select optimal network designs
for implementation

Measure impact & assess benefit of network optimization
Using LLamasoft’s Supply Chain Guru and Data Guru software

**Constructing a network model: data inputs**

- **Sites**
  - Number, location and level/type of sites
  - Health facilities
    - Demand for testing
  - Laboratories and testing sites
    - Test menu and capacity

- **Transportation Policies**
- **Sourcing Policies**

- **Specimen transport modalities, routes and costs**

- **Demand**
  - Number and type of tests orders per facility

- **Tests**
  - Referral linkage between sites
  - Test inputs and costs
Population

Disaggregate population by age, gender, HIV, previous TB treatment (MDR-TB risk) and poverty

Determine virtual catchment population using health service utilization proportions by health facility level

Disaggregated population eligible for screening per health facility

People screened for TB

Active case finding

Passive case finding

People screened for TB with signs & symptoms (presumptive TB patients)

Presumptive TB patients who get laboratory test at initial diagnosis

Presumptive TB patients who do not get laboratory test at initial diagnosis

CXR*

CXR*

CXR*

No CXR

No CXR, clinical evaluation only

1 or both smears positive

Both smears negative

Clinical exam & CXR

Clinical exam, no CXR

Not suggestive of TB

Suggestive of TB

Xpert

MTB detected, RIF R

MTB detected, RIF S

MTB detected, RIF indet.

Error/invalid/no result

MTB not detected

Culture/DST/LPA

Monitor with culture

Monitor with smear

Consider alternative diagnosis

Treat DR-TB

Treat DS-TB, BC

Treat DS-TB, CD

Do not treat for TB

Treat DS-TB, CD

Do not treat for TB

Composite Diagnostic Algorithm

(TB example shown, can be customized to other disease and/or country context)

Collate outputs (number of each diagnostic tests per health facility)

Input testing demand per facility for each diagnostic test into network modelling software
Expected outputs

**Improve access**
- Reduce loss to follow up and diagnostic delay
- More people diagnosed and treated

**Increase network efficiency**
- Reduce procurement and operating costs
- Easier-to- manage device footprint

**Greater visibility of network**
- More efficient funding allocation
- Country empowerment & better decision-making
Lessons learned

- Need early and ongoing engagement of partners and stakeholders in all stages
- Data collection, cleaning and compilation takes time
- Customize scenarios to answer priority questions and provide the right evidence to make decisions
- It’s still only a model - outputs need validation by on-the-ground implementers for feasibility and require partner/donor support for implementation
- Align with strategic planning and/or funding cycles to facilitate uptake of recommendations
- Network optimization analysis should be a dynamic process; plan to update models, re-look at demand projections, and use model to inform roll out of new tools and interventions
Translating network optimization outputs into action

Implementing output may include:
- National policy
- National and district level management
- Sample transportation
- Contracting
- Procurement and supply chain
- Finance
- Training
- QA and performance monitoring

Recommendations:
1. **8 of 13 new GXs in country should be moved.**
2. **Adjust referral flows across district borders.**
3. Model suggests to **cancel procurement of the other 7 GXs planned for purchase.**
4. **33 POC DX devices should be added**, including 3 for highly inaccessible sites.
Thank you

Kamene Kimenye, Elizabeth Onyango, Eunice Omesa, Jeremiah Ogoro, Richard Kiplimo, Newton Omale, Drusilla Nyaboke, Elvis Muriithi, Stephen Macharia, Josephat Tonui & NTLP team, Kenya

Sheilla Chebore, Brenda Mungai, Lorraine Nyaboga, Centre for Health Solutions Kenya
Enos Masini, WHO Kenya
Timothy Ngugi, CHAI Kenya

Celina Garfin, Donna Geocaniga-Gaviola, Eddie Sistolo, Ramon Bailio, Allan Fabella, NTP Team Philippines, Rajendra Yadav, WHO Philippines

Sid Rupani, Rahul Roopsingh, Holynne Steppe, Lan Lan, Ryan Purcell, Llamasoft
Zachary Katz, Kekeletso Kao, FIND
Christy Hanson, Daniel Chin, BMGF

Financial support: Bill & Melinda Gates Foundation