**MATCH: Mapping and Analysis for Tailored disease Control and Health system strengthening**

**Rationale**

Global efforts to improve Tuberculosis (TB) case detection and treatment coverage have not been effective to substantially reduce the burden of the TB epidemic worldwide. Estimates of global TB prevalence from the World Health Organization have shown that 61% of the estimated number of incident TB patients are detected and notified by national TB programs.

Context specific subnationally targeted interventions focusing on specific areas and at-risk populations have been shown to significantly improve the timely detection and treatment of TB. The continuous analysis of subnational data assists in identifying and locating TB transmission hot spots and key target populations, and linking these to geographic patterns of TB diagnostic and treatment service delivery. It also enables one to monitor the effect of interventions implemented to reach people who are missed by health systems. **Taking a health systems approach, triangulating information of TB risk, access to services, and TB case detection, generates insight into where and why people with TB are “missed” either because they are not diagnosed, or diagnosed but not reported to national surveillance systems.** The possibilities of using this approach to monitor and evaluate TB case detection efforts are abundant and clear.

To plan and allocate resources efficiently and effectively, it is imperative for NTPs to integrate, map and analyze data from a variety of sources (health information and service delivery data, surveys, surveillance data, research data) to inform locally tailored approaches.

**MATCH overview**

KIT has developed the MATCH approach which builds NTP capacity to target interventions using existing data, and to use mapping and spatial analysis techniques to inform decision making. Core to this approach is an analytical framework which utilizes multiple sources of disaggregated spatial, temporal and demographic data with the aim to identify most pertinent groups of missed people with TB throughout the pathway of care at a subnational level. MATCH should not be regarded as a tool per se but as an analytical framework, which can be locally adapted and routinely conducted to monitor program delivery and performance and guide policy making and programming of interventions both at national and sub national level.
MATCH components
To generate new insights and hypotheses regarding the operational constraints NTP programs are facing, the following activities are sequentially conducted by the NTP and their partners.

1. **Rapid situational analysis**
The first part of MATCH involves a desk based assessment of key documents and data to assess the epidemiological situation, current operational procedures and interventions being implemented, and potential sources of data required to fill information gaps. In parallel an assessment of data sources and electronic access to these data at various levels of spatial aggregation is ongoing.

2. **Data consolidation and collation**
Based on the key operational issues, data from various sources are collated and consolidated into a single standardized database. The scale and unit of analysis are determined by the lowest (most local) subnational geographic denominator to which all data elements can be mapped. Using Geographic Information Systems (GIS) enables the integration of data from various sources, derived at different spatial scales, into a single spatial database which allows one to cross validate data.

3. **Participatory data analysis and training workshops**
Since local stakeholders and partners have the best knowledge of local processes and apparent constraints of their programs, data analysis is conducted in a participatory manner. This makes it possible to iteratively assess, scrutinize and interpret outcomes while taking into account local knowledge and expertise, and simultaneously building the analytical capacity of data analysts and M&E experts. The data analysis typically involves the following types of spatial data analyses:
   a. Indicator mapping and geographic trend analysis
   b. Spatial coverage, service supply and access analysis (network analysis)
   c. Gap analysis and data triangulation.

4. **Hypothesis generation and verification**
Based on the outcomes of the various analyses, a selection of regions where programmatic inconsistencies were found are prioritized. For these regions, epidemiological and programme profiles are composed and a number of hypotheses stating why people with TB might be missed are formulated and linked to possible interventions. The different hypotheses regarding prioritized regions are verified by conducting supervisory visits and qualitative verification.

5. **Definition of tailored interventions**
Context-specific interventions addressing the identified gaps and challenges are developed. Interventions are tailored to regional requirements and designed based on the existing evidence and lessons learned from programmes and pilots in similar contexts.

6. **Routine monitoring and updating**
Once interventions are implemented it is key to assess shifts in TB case notification rates in intervention areas and the effect of changes in notification in the wider adjacent areas. This could be indicative of improved TB case detection, but only if a rise in notification was found without a decrease in notification in adjacent areas.

These steps are usually done first at national level but are well suited and better placed to guide provincial and district level analysis and planning.
**TB case notification gaps – indications of under detection - MATCH in Bangladesh.**

In Bangladesh the MATCH approach was implemented using district level TB case notifications data which were integrated with socio-economic data from the 2013 census as well and routine laboratory data. During a participatory data analysis workshop the NTP, together with their implementing partners (BRAC, ICDDR,B, MSH), collaboratively mapped and analysed these data using the MATCH framework.

In the central-southern region (yellow highlighted districts), TB case notification rates were considerably lower than the country average and also compared to the CNR in directly adjacent districts. Analysis and triangulation with other program components showed that:

- Test rate is low but the proportion of bac+ patients among all notified is comparatively high;
- Positivity rate of tests performed is low;
- The poverty rate in these areas is relatively high as compared to the country average.

These findings led to the following hypotheses:

- The information on socioeconomic status and risk factors suggest no reason to believe the actual burden in this area is significantly lower than in the neighbouring districts;
- Low test rates and low positivity rates suggests many patients are not reaching quality diagnosis;
- Low coverage of microscopic facilities indicate poor coverage of diagnostic services;
- Above average percentage of bacteriologically confirmed patients among the low number of notified patients suggests that also many smear negative and extra-pulmonary patients might be missed.

Interventions to be considered in these areas after verification of hypotheses:

- Need to increase presumptive case finding through improved screening in facilities and community;
- Improve coverage of Xpert testing for all microscopy negative and X-ray for B+ presumptive cases;
- Conduct more supervisory visits to find out the root cause of lower notification rate over the years;
- Check completeness of notification system.

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