Assessment of the performance of TB surveillance in Kenya
main findings, key recommendations and associated investment plan

Accra, Ghana
May 1st 2013
Hillary K. Kipruto
on behalf of the Kenya team
System description: Kenya

- Paper Based R and R system
- Transitioning to case-based electronic recording and reporting system – TIBU System
  - Data entry at district level (Case based data 2012)
  - Data entry at facility level to follow
  - [http://pms.dltld.or.ke](http://pms.dltld.or.ke)
- Vital registration system still weak and TB mortality
  Estimates are obtained from WHO Annual reports
- Efforts to strengthen vital registration systems (ICD-10 in hospitals, verbal autopsy (VR) in community)
Assessment method

• Using Standards and Benchmark check list developed by WHO

• Technical review by:
  – Emily Bloss, CDC/DTBE
  – Niki Alami, CDC/DTBE
  – Deanna Tollefson, CDC/DTBE
  – Hillary Kipruto, WHO-Kenya

• 2-5<sup>th</sup> April 2013
RESULTS

• Data Quality
• Population Coverage and Civil Registration
• Special Populations
# Data Quality

<table>
<thead>
<tr>
<th>Standard</th>
<th>Main findings</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B1.1</strong> Case definitions consistent with WHO guidelines</td>
<td>Case definitions are consistent with WHO guidelines</td>
<td>MET</td>
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</tbody>
</table>
| **B1.2** TB surveillance system designed to capture a minimum set of variables for reported TB cases | *Paper based system*: age x sex breakdown only in new cases sm+, sm- and EP; not for re-treatment cases. *(Partially met)*  
*Electronic system*: *(Met)* | PARTIALLY MET-  
Paper System  
Met-Electronic System |
| **B1.3** All scheduled periodic data submissions received and processed at the national level |  
- 896/900 (99.5%) of expected quarterly reports had been received and processed at national level. However, due to some unusual delays because of the elections, the usual annual meeting that is conducted in April to review and finalize reports had not yet been conducted and is planned for end of April, after assessment. | PARTIALLY MET |
### Data Quality (cont.)

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>B1.4</strong> Data in quarterly reports are accurate, complete, and internally consistent <em>(For paper-based systems only)</em></td>
<td>- Based on a review of data from one District and clinic, we found 100% match in number of cases in TIBU quarterly case report, facility register and district registers and patient cards</td>
<td>☒ Partially met</td>
</tr>
</tbody>
</table>
| **B1.5** Data in national database are accurate, complete, internally consistent, and free of duplicates *(For electronic case-based or patient-based systems only)* | - **Data checking for completeness of records**: 0 empty records.  
- **Data checking for system missing variables**: Data 100% complete for minimum set of variables, except for 1 case missing smear data.  
- **Data checking for duplicates**: 2% of cases with duplicate IDs are in system (not yet resolved).  
- **Data checking for inconsistencies**: a) -0.05% of cases had age >100 years, b) 0.28% of IDs did not follow correct format, c) 0 cases with date of registration after present date d) 0.005% with date of start treatment after to the date of end treatment | ☒ Partially met |
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<tr>
<td><strong>B1.6</strong> TB surveillance data are externally consistent</td>
<td>4798 children smears not done + 5338 children with smear +, smear - and EP = 10,136 total cases 10136/98665 = 10.3%</td>
<td><strong>MET</strong></td>
</tr>
<tr>
<td><strong>B1.7</strong> Number of reported TB cases is internally consistent (within country)</td>
<td>-No vital registration system with accurate and universal causes of death recorded to measure TB mortality.</td>
<td><strong>NOT MET</strong></td>
</tr>
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Internal Consistency: Number of TB Cases Reported

Number of reported TB cases by district, Kenya, 2008-2012,
Internal Consistency:
Change in TB Cases Reported

Percent change in reported TB cases by district in Kenya, 2008-2012.

- Nairobi North
- Nairobi South
- Central
- Eastern North
- Eastern South
- Coast
- Nyanza North
- Nyanza South
- Rift Valley North
- Rift Valley South
- Western
- North-eastern
- Refugee
Internal Consistency: % Pulmonary TB Cases

Ratio of Pulmonary to Extrapulmonary TB Cases in Kenya, 2008-2012
(% Pulmonary)

*Pulmonary cases include those classified as smear positive, smear negative, and smear not done.

**Only new TB cases, retreatment cases not included.
Internal Consistency:
% Retreatment Cases

Ratio of Retreatment to New TB Cases

<table>
<thead>
<tr>
<th>Year</th>
<th>Retreatment</th>
<th>New</th>
</tr>
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<tbody>
<tr>
<td>2008</td>
<td>9.5%</td>
<td>98.5%</td>
</tr>
<tr>
<td>2009</td>
<td>9.7%</td>
<td>98.3%</td>
</tr>
<tr>
<td>2010</td>
<td>9.9%</td>
<td>98.1%</td>
</tr>
<tr>
<td>2011</td>
<td>9.6%</td>
<td>98.4%</td>
</tr>
<tr>
<td>2012</td>
<td>9.7%</td>
<td>98.3%</td>
</tr>
</tbody>
</table>

Number of TB Cases

- 0
- 20,000
- 40,000
- 60,000
- 80,000
- 100,000
- 120,000
Internal Consistency: Gender Ratio

Ratio of Male to Female TB Cases in Kenya by district, 2008-2012

*Cases include smear positive, smear negative, and extrapulmonary cases. No smears done and retreatment cases not included.

HIV Testing
83.0% 87.8% 91.4% 93.4% 94.2%

HIV Prevalence
45.0% 43.7% 41.3% 39.3% 38.3%
## Population Coverage and Vital Registration

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| **B2.1** All diagnosed cases of TB are reported | - In Kenya, TB reporting is a legal requirement  
- No national inventory study conducted for TB cases in last 10 years | ☒ Partially met |
| **B2.2** Population has good access to health care | - Under-5 mortality rate is 73/1000 (WHO, 2009)  
- 46% total health expenditure is out-of-pocket (WHO, 2011)  
Out-of-pocket expenditure as % of private expenditure on health = 74% (Kenya NHA report, 2011) | NOT MET |
| **B3.1** Vital registration system has high national coverage and quality | - Cause of death is documented in 47% of deaths and >10% of deaths have ICD codes | NOT MET |
## Special Populations

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| **C1** Surveillance data provide a direct measure of drug resistant TB in new cases | -Culture and susceptibility testing only done routinely for high risk groups (re treatment, MDR TB contacts, HCWs), not routinely for new cases  
- No DRS has yet been conducted  
- DRS to start soon                                                              | NOT MET  |
| **C2** Surveillance data provide a direct measure of the prevalence of HIV infection in TB cases | - In 2012, 92461/98690=94% tested; data of # tested are collected in quarterly reports.                                                        | MET      |
| **C3** Surveillance data for children reported with TB are reliable and accurate OR all diagnosed childhood TB cases are reported | - Ratio of age groups 0-4 (n=1336) to 5-14 (n=3981) years is 0.34 (note: This is based on data for cases with sm+, sm-, EP and excludes smears not done because these data are not disaggregated for 0-4 and 5-14 years (smear not done for 4798 children of <15).  
- No national inventory study conducted for childhood TB cases in last 10 years | NOT MET  |
Findings: Overview

<table>
<thead>
<tr>
<th>Data Quality</th>
<th>Population Coverage</th>
<th>Vital Registration</th>
<th>Special Populations</th>
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<tbody>
<tr>
<td>Out of 7 standards</td>
<td>Out of 2 standards</td>
<td>Out of 1 standard</td>
<td>Out of 3 standards</td>
</tr>
<tr>
<td>• 3 met</td>
<td>• 1 not met</td>
<td>• 1 not met</td>
<td>• 1 met</td>
</tr>
<tr>
<td>• 2 partially met</td>
<td>• 1 partially met</td>
<td></td>
<td>• 2 not met</td>
</tr>
<tr>
<td>• 2 not met</td>
<td></td>
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</tbody>
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Recommendations: Short Term

- Hire IT staff (2) and epidemiologist (1) to support electronic system (TIBU) and data analysis at national level
- Perform data audit to assess data quality at national level
- Conduct surveillance system evaluation as system moves into next phase of roll-out
- Conduct a national drug resistance survey
Recommendations: Medium Term

- Assess barriers to health care and previously unreported cases in TB prevalence survey
- Monitor the level of underreporting through inventory studies
- Support strengthening of routine vital registration system to ensure accurate causes of (TB) death in community and hospitals (ICD-10)
- Utilize the information derived from ongoing SARAM in the country
# Investment plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Estimated Budget</th>
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<tr>
<td>Inventory study to measure the level of under-reporting</td>
<td>US$ 250,000</td>
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<td>Capacity building for data management and statistical analysis – through attending courses and extra staffing at the central level</td>
<td>US$257,000</td>
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<tr>
<td>Data Quality assessment</td>
<td>US$ 128,000</td>
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<td>Evaluation of the Kenyan Surveillance system</td>
<td>US$ 30,000</td>
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<tr>
<td>Analysis of available mortality data</td>
<td>US$ 7,000</td>
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<td>Drug resistance survey</td>
<td>US$ 400,000</td>
</tr>
<tr>
<td>Delay in Diagnosis survey</td>
<td>US$ 56,000</td>
</tr>
<tr>
<td>Vital registration – Strengthening on reporting of the underlying cause of death</td>
<td>USD 600,000***</td>
</tr>
<tr>
<td>TB Mortality Survey</td>
<td>USD 525,000</td>
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Asante!