The Introduction to
TB Electronic R&R System
in China

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Background

- **Outbreak of SARS in China in 2003**
  - Weakness in public health system
  - Need for government to get involved in tackling public health issues

- **Implementation of IDRS**
  - In 2004, the MOH launched web-based Infectious Disease Reporting System (IDRS)
  - 37 notifiable infectious disease can be reported real-timely by all health facilities
Development history

Jan, 1, 2004
Launch Information System for Infectious Disease

Jan, 1, 2005
Launch TB Information management System

Jul, 1, 2007
Need to optimize the TB system

Mar, 8, 2009
Launch new TB System

Oct, 2010
Decide to upgrade DR-TB system

Apr, 1, 2011
New DR-TB module online

2004
2005
2006
2007
2008
2009
2010
2011

Collect feedback
- Requirement analysis
- Upgrade
- Test

Collect feedback
- Requirement analysis
- Upgrade
- Test

China CDC
Login window for system
Interface of TBIMS

China CDC
Modules and functions of TBIMS

Data Collection
- Report card
- Medical record
- Project
- Manual report

Quality Assessment
- Timeliness
- Completeness
- Accuracy
- Reminder

Output
- Real time
- ......
- Fixed time
- ......

System management: dictionary maintenance, bulletin board, etc.
Infectious disease report card

- Case name, ID, gender, birthday...
- Address, career...
- Date of onset, diagnosis and death
- Case category
- Disease name
- Doctor name, report date, tel...

<table>
<thead>
<tr>
<th>Address</th>
<th>Career</th>
<th>Date of Onset</th>
<th>Diagnosis</th>
<th>Death</th>
<th>Case Category</th>
<th>Disease Name</th>
<th>Doctor Name</th>
<th>Report Date</th>
<th>Tel...</th>
</tr>
</thead>
</table>

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By end 2010, web-based IDRS covered 100% of CDCs, 97% of county and above hospitals and 82.21% of township level clinics, up to 68,000 users (facilities).

Every day, about 25,000 infectious disease cases are reported.
Relationship between IDRS and TBIMS

IDRS: Infectious Disease Reporting System
TBIMS: TB Information Management System

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Report card management

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- Reporting area
- Case address
- Local cases reported by local facilities
- Local cases reported by exotic facilities
- Migrant cases reported by local facilities

Green: un-validated
Black: validated
Blue: deleted
Red: uncompleted

China CDC
How to manage floating population?

TB case can be transferred from one server to another user.
Key variables collected by TBIMS

❖ Basic information
  ▪ Registration unit/date/No.
  ▪ Name, sex, age, company, ID, etc.
  ▪ Treatment history, registration type
  ▪ Census register, current address

❖ Lab examination
  ▪ X-ray
  ▪ Smear, culture
  ▪ DST: type (rapid/classical), date, drug name, result (sensitive/resistant/contaminated)
  ▪ HIV
Key variables collected by TBIMS

- **Treatment & management**
  - Diagnosis date/result
  - Reason for waiting for treatment
  - Reason for no treatment
  - Start/end date for treatment, treatment regimen and result
  - Drug source: domestic/ GLC
  - Date and reason for stopping treatment
  - Supervision unit
Data quality assurance

- Logical check is performed when entering data
  - Ex. Date of onset should be earlier than notification date
- Aggregated report gives a general review of data quality
  - Including timeliness report, completeness report

<table>
<thead>
<tr>
<th>County</th>
<th>Total registered</th>
<th>No. of cases that have questions, such as didn't enter the last month's sputum result within 2 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>深圳市</td>
<td>2032</td>
<td>49</td>
</tr>
<tr>
<td>罗湖区</td>
<td>211</td>
<td>7</td>
</tr>
<tr>
<td>福田区</td>
<td>199</td>
<td>35</td>
</tr>
<tr>
<td>南山区</td>
<td>229</td>
<td>39</td>
</tr>
<tr>
<td>宝安区</td>
<td>899</td>
<td>75</td>
</tr>
<tr>
<td>龙岗区</td>
<td>404</td>
<td>94</td>
</tr>
<tr>
<td>盐田区</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>光明新区</td>
<td></td>
<td></td>
</tr>
<tr>
<td>坪山新区</td>
<td></td>
<td></td>
</tr>
<tr>
<td>不详县</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

China CDC
Data quality assurance

- Problematic records can be identified as well.

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<table>
<thead>
<tr>
<th>按照首管理地区</th>
<th>首诊断单位</th>
<th>首诊诊断单位</th>
<th>首诊诊断单位</th>
<th>首诊诊断单位</th>
<th>首诊诊断单位</th>
</tr>
</thead>
<tbody>
<tr>
<td>按照首管理地区</td>
<td>首诊断单位</td>
<td>首诊诊断单位</td>
<td>首诊诊断单位</td>
<td>首诊诊断单位</td>
<td>首诊诊断单位</td>
</tr>
<tr>
<td>登记时间</td>
<td>2011-01-22 至 2011-04-22</td>
<td>治疗分类</td>
<td>--请选择--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>诊断结果</td>
<td>患者</td>
<td>患者</td>
<td>患者</td>
<td>患者</td>
<td>患者</td>
</tr>
<tr>
<td>质量统计规则</td>
<td>2月疫苗结果空白或未查</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>审核标记</th>
<th>登记号</th>
<th>首诊病区</th>
<th>姓名</th>
<th>性别</th>
<th>出生日期</th>
<th>年龄</th>
<th>诊断结果</th>
<th>登记日期</th>
<th>登记分类</th>
<th>治疗分类</th>
<th>病案状态</th>
<th>操作</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2011-2045</td>
<td>南山区慢性病院</td>
<td>张正军</td>
<td>男</td>
<td>1990-02-16</td>
<td>21</td>
<td>感染患者</td>
<td>2011-02-16</td>
<td>新患者</td>
<td>初治</td>
<td>在治</td>
<td>查看</td>
</tr>
<tr>
<td></td>
<td>2011-2034</td>
<td>南山区慢性病院</td>
<td>罗亚林</td>
<td>男</td>
<td>1982-01-03</td>
<td>29</td>
<td>感染患者</td>
<td>2011-02-12</td>
<td>新患者</td>
<td>初治</td>
<td>在治</td>
<td>查看</td>
</tr>
<tr>
<td></td>
<td>2011-0006</td>
<td>南山区慢性病院</td>
<td>朱文武</td>
<td>男</td>
<td>1989-12-10</td>
<td>21</td>
<td>感染患者</td>
<td>2011-02-14</td>
<td>新患者</td>
<td>初治</td>
<td>在治</td>
<td>查看</td>
</tr>
<tr>
<td></td>
<td>2011-0004</td>
<td>南山区慢性病院</td>
<td>刘聪</td>
<td>女</td>
<td>1979-06-01</td>
<td>32</td>
<td>感染患者</td>
<td>2011-01-30</td>
<td>新患者</td>
<td>初治</td>
<td>在治</td>
<td>查看</td>
</tr>
</tbody>
</table>

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Two way to produce report

- **Real-time**
  - Specify any time period
  - Data were calculated every mid-night, and then the result will be stored as static form in the system

- **Fixed-time**
  - Can only select fixed time duration, like year, quarter, month, etc.
  - Data were calculated the 5th day of every month, quarter and year automatically
## Output

<table>
<thead>
<tr>
<th>Category</th>
<th>Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case detection</strong></td>
<td>Notification of various type of PTB, patient source, and suspect examination, etc.</td>
</tr>
<tr>
<td><strong>treatment and management</strong></td>
<td>Sputum conversion, cohort outcome, systematic management, etc.</td>
</tr>
<tr>
<td><strong>NTP activity</strong></td>
<td>Fund, training, supervision, health education and so on.</td>
</tr>
<tr>
<td><strong>Drug</strong></td>
<td>Quarter expenditure of drug</td>
</tr>
<tr>
<td><strong>Lab</strong></td>
<td>Blind re-check result of sputum smear</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>Basic information of TB dispensary, human resource, etc.</td>
</tr>
</tbody>
</table>

China CDC
Only one user management system for more than 10 systems, including IDRS, TBIMS, HIV system, Plague system, etc.
Features of TBIMS

- IDRS, TBIMS and DR-TB are linked with each other and exchanging data real-timely
- DR-TB suspect, DR-TB case and PTB case are integrated into one web-based system, however, the data for each are stored in different database
- Combined search can identify any specific suspects/cases in the database
- Quality assessment module can tell us how is the entered data quality
- Enhanced output
Difficulties

- **Computer**
  - Many TB dispensaries don’t have special computer for TB

- **Human resource**
  - Many don’t know how to use computer
  - Too many work to do, so many had to work after hours

- **Internet service**
  - Not stable, slow sometimes

- **Software System**
  - Always have bugs
  - Updated requirement

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Lessons

- **Clear system requirement**
  - What data to be collected
  - What output to be produced
  - What management function to be provided

- **System pilot**
  - Pilot->find bug->solve

- **Training**
  - Directly train the ultimate users if possible
Next step

- **Server distribution**
  - Central → distributed in different provinces

- **Data collection**
  - Key variables → different variables at different level

- **System links**
  - Infectious disease reporting system
  - HIV information system
  - Vital registration system
  - .......

- **Output**
Thank You!