The presentation of the 5th Nationwide Tuberculosis Epidemiological Sampling Survey in China

National Center for TB Control and Prevention, China CDC
Shiwen Jiang
2010.10.05
Contents

• Overview
• Preparation before implementing TB survey in field
• Implementing TB survey in field
• Quality Control
• Replying to difficulties and challenges
• Experiences
• Paradigm of organizing in the basic unit
Overview—general information

Areas: 9.6 M sq.km
Population: 1.36 billion
Province: 31
Prefecture: 343
County: 2855
China is one of the 22 countries with high TB burden, ranking second in terms of the number of TB patients in the world.

China once conducted four nationwide TB epidemiological sampling surveys in 1979, 1984-1985, 1990 and 2000, accumulating valuable epidemiological data and providing the scientific evidences for framing and guiding the nationwide TB control work.
Overview—objective of TB survey

- To know the epidemic of TB in China
- To evaluate the implementation of the National TB Control Programme (2001-2010)
- To provide evidences for developing the next ten-year programme
• This TB survey is mainly to get nationwide TB epidemiological indicators and evaluate data.
• The proportionate stratified random sampling method is proposed to be used.
• According to the estimation of cluster sampling, there are 176 nation-level TB survey sites and about 1,500 people per site are surveyed.
<table>
<thead>
<tr>
<th>Province</th>
<th>Population size (ten thousand)</th>
<th>Number of sites to be surveyed in 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>1581</td>
<td>2</td>
</tr>
<tr>
<td>Tianjin</td>
<td>1075</td>
<td>2</td>
</tr>
<tr>
<td>Hebei</td>
<td>6898</td>
<td>9</td>
</tr>
<tr>
<td>Shanxi</td>
<td>3375</td>
<td>5</td>
</tr>
<tr>
<td>Inner Mongolia</td>
<td>2397</td>
<td>3</td>
</tr>
<tr>
<td>Liaoning</td>
<td>4271</td>
<td>6</td>
</tr>
<tr>
<td>Jilin</td>
<td>2723</td>
<td>4</td>
</tr>
<tr>
<td>Heilongjiang</td>
<td>3823</td>
<td>5</td>
</tr>
<tr>
<td>Shanghai</td>
<td>1815</td>
<td>2</td>
</tr>
<tr>
<td>Jiangsu</td>
<td>7550</td>
<td>10</td>
</tr>
<tr>
<td>Zhejiang</td>
<td>4980</td>
<td>7</td>
</tr>
<tr>
<td>Anhui</td>
<td>6110</td>
<td>8</td>
</tr>
<tr>
<td>Fujian</td>
<td>3558</td>
<td>5</td>
</tr>
<tr>
<td>Jiangxi</td>
<td>4339</td>
<td>6</td>
</tr>
<tr>
<td>Shandong</td>
<td>9309</td>
<td>12</td>
</tr>
<tr>
<td>Henan</td>
<td>9392</td>
<td>13</td>
</tr>
<tr>
<td>Hubei</td>
<td>5693</td>
<td>8</td>
</tr>
<tr>
<td>Hunan</td>
<td>6342</td>
<td>9</td>
</tr>
<tr>
<td>Guangdong</td>
<td>9304</td>
<td>12</td>
</tr>
<tr>
<td>Guangxi</td>
<td>4719</td>
<td>6</td>
</tr>
<tr>
<td>Hainan</td>
<td>836</td>
<td>1</td>
</tr>
<tr>
<td>Sichuan</td>
<td>8169</td>
<td>11</td>
</tr>
<tr>
<td>Guizhou</td>
<td>3757</td>
<td>5</td>
</tr>
<tr>
<td>Yunnan</td>
<td>4483</td>
<td>6</td>
</tr>
<tr>
<td>Tibet</td>
<td>281</td>
<td>1</td>
</tr>
<tr>
<td>Chongqing</td>
<td>2808</td>
<td>4</td>
</tr>
<tr>
<td>Shanxi</td>
<td>3735</td>
<td>5</td>
</tr>
<tr>
<td>Gansu</td>
<td>2606</td>
<td>4</td>
</tr>
<tr>
<td>Qinghai</td>
<td>548</td>
<td>1</td>
</tr>
<tr>
<td>Ningxia</td>
<td>604</td>
<td>1</td>
</tr>
<tr>
<td>Xinjiang</td>
<td>2050</td>
<td>3</td>
</tr>
<tr>
<td>Nationwide</td>
<td>131448</td>
<td>176</td>
</tr>
</tbody>
</table>
Overview-contents and methods of TB survey

• **Pulmonary TB prevalence**
  – All subjects should be X-ray tested. All pulmonary TB suspects should receive three sputum smear tests and two sputum culture tests to attain the prevalence of active, smear positive and culture positive pulmonary TB respectively.

• **M. tuberculosis strain identification and DST**
  – All strains during the TB survey should be identified, and DST should be performed for first- and second-line anti-TB drugs.

• **Socio-economic status of pulmonary TB patients**
  – Questionnaires should be given to all pulmonary TB patients during this TB survey to learn about their socio-economic status in terms of incurrence, clinic visit and treatment.
Overview-schedule

• Preparation (June 2009-March 2010)
  – Formulating the plan and implementation protocol for the TB survey during June-December 2009.
  – Selecting one site to conduct pilot work in November 2009 and revising and refining the implementation detailed rules of the TB survey according to pilot findings.
  – Convening a national starting and training workshop in March 2010 to train provincial staff according to the implementation protocol and detailed rules.

• Implementation (April-June 2010)
  – All provinces carrying out the TB survey in field according to the implementation protocol during April-June 2010.

• Acceptance and summarization (June 2010-April 2011)
  – Accepting the TB survey by the National Technical Advisory Group and National Office during June-July 2010.
  – Rechecking and summarizing basic data by the National Office during August-October 2010.
  – Analyzing data and compiling reports during October 2010-April 2011.
• Survey situation
  – In the whole 176 sites, the number of sample population which were born before 31th,December 1995 (≥ 15 years old) were 388,446 cases, in which 125,136 cases were out for more than six months(they are not reside in the region), 263,310 cases were subjects to be surveyed.
  – 252,844 cases were actual examined people, accounting for 96.0% of the subjects to be surveyed. This Survey rate had met the qualification(95%) of the Detailed rules.
Overview—main results

• Symptom survey
  – 252,844 cases accepted symptom survey totally
  – Of which 5,358 cases (2.14%) had PTB suspected symptom

• chest X-ray
  – 250,638 cases accepted chest X-ray examination
  – Of which 2,878 cases had Abnormal chest X-ray finding with suspected TB lesion

• Sputum examination
  – There were 9,693 cases which need to examined the Sputum smear, and 9,591 cases had examined actually, with sputum examination rate be 98.95%.
Preparation—national organization

- The China MOH issued *Plan and Implementation Protocol for the 5th Nationwide Tuberculosis Epidemiological Sampling Survey*

- it is decided to set up the National Leading Group, National Technical Advisory Group and National Office. Provinces should establish same units which are like central level.
  - National Leading Group
    - They are responsible for the organization and leadership of the TB survey, multi-sector coordination and fund raising.
  - National Technical Advisory Group
    - They are responsible for the design of the TB survey, formulation of standards and operational guidelines, training of professionals, organization of symposiums, acceptance of data, quality evaluation, summarization of TB survey and completion of survey reports.
  - National Office
    - They are responsible for the implementation of the TB survey, daily routines, organization of professional conferences and training workshops, inspection and guidance in field, acceptance and compilation of data and coordination of the publication and distribution of survey reports. The National Office is set up at the National Center for TB Control and Prevention, China CDC.
• MOH had increased the survey finance of the local PTB control fund under the Central transferring payment system (2010), to ensure the quality of the survey.

• Finance supporting contents include: holding conferences, training, organization and implementation in field, allowance for people surveyed, strains storage and transportation and acceptance etc.

• Providing 32 million RMB yuan for the survey, average 180,000 RMB yuan for each site, providing guarantee for survey’s successful development and high quality.
Preparation—formulating implementation Protocol and the detail rules

- Held four times preparation conferences of TB survey in 2008, clarifying the main survey objective, survey subject, the method of survey and sampling etc.

- From drafting the detail rules in September 2009 to final version in March 2010, experts from National Leading Group, National Technical Advisory Group and National Office participated into formulating implementation Protocol and the detailed rules by lots of conferences.
Preparation—pilot

- Selecting Tongxu county of Henan province to be the survey pilot site during 23th November to 3th December, to ensure whether the Detailed rules and Field Entry is available.
- Summarizing pilot problems and experiences, consequently revising and improving the detailed rules
• Set up the Provincial Leading Group, Provincial Technical Advisory Group and Provincial Office

• Establish and issue provincial implementation protocol and work plans
  – Provincial health authorities: developing provincial implementation plans for TB survey and forming TB survey teams.
  – Prefectural/city health authorities: assisting TB survey teams in field survey
  – County/district health authorities: verifying information on households in accordance with demographic household cards and arranging working place, food and accommodation for TB survey teams
  – Townships/subdistricts where epidemiological survey sites are located: forming leading groups, which are responsible for on-site organization and coordination
  – Village/neighborhood committees: publicizing and mobilizing the TB survey through various channels and assisting TB survey teams in the population verification
Preparation—setting up provincial TB survey teams

- TB survey teams are responsible for survey in field and data collection and collation. Technical advisory groups are responsible for acceptance.
- Established 160 TB survey teams in whole country.
- Each TB survey team consists of 10-15 members (provincial and prefecture personnel).
  - Team leader: one and responsible for organizing overall aspects of field survey.
  - Field coordinator: one and responsible for organizing residents to receive examination and collecting sputum specimens.
  - Laboratory technicians: two and responsible for collecting, transporting and testing sputum smears and recording laboratory results.
  - Chest X-ray technicians: two and responsible for performing chest X-ray.
  - Physicians: four and responsible for reading chest X-ray films, making diagnosis, conducting symptom and awareness survey for survey subjects, writing medical records, filling in patient cards and conducting questionnaire survey for socio-economic status of patients.
  - Data managers: three and responsible for filling in and collating demographic household cards, entering symptom and awareness survey results, chest X-ray findings, sputum smear and culture results and patient cards, and performing data statistics.
Preparation-training

• National training
  – Held on the start and training workshop for 5th Nationwide Tuberculosis Epidemiological Sampling Survey 4th-5th March 2010 in Beijing.

• provincial training
  – Unified training should be provided by the provincial level to members of TB survey teams.
  – Detailed explanation and simulation exercise should be organized for the Detailed rules for Implementation.
**Preparation—designing and issuing publicity materials**

- Issued publicity poster and foldout to provincial office on 6th April 2010

**Publicity poster**

**Publicity foldout**
Preparation—local preparation of materials, equipment and procedures

- TB survey teams should make all necessary commodities available, including IEC materials, various forms, medical records, survey questionnaires, sputum containers, laboratory diagnostic reagents and equipment, X-ray films, computers, printers etc.
- select an appropriate place for test and make sure the chest X-ray equipment available.
- County health authorities should arrange vehicles to and from TB survey sites.
- TB survey teams should arrange smear and culture laboratories according to local situations of TB survey sites
- apply for licenses for transportation of highly pathogenic specimens and strains within provinces from health authorities. After the end of field survey, the provincial level should apply for cross-province transportation licenses.
Implementing in field—government mobilization

- Key point of this success is sufficient financial, human resource, administrative support from administration of different level.
- TB survey was a collaborative operation including health sectors, financial sectors and related partnership. Seminars were held before the start of TB survey which ensured the efficient execution of the field survey.
- Mobilization conference also was made in county level.
Implementing in field-deployed survey

- After arriving at TB survey sites, seminars were held between TB survey teams and related staff from city, township and village levels.
- Agreement of objectives, method, schedule, requirements for field survey, along with a clear division of responsibilities and indicators were reached in the seminar.
- Workflows and duties had be further clarified according to actual conditions of TB survey teams and field investigators.
• Street / township government, neighborhood committees / village committees and other grass-rooted organizations played important roles in mobilization of residents

• Neighborhood / village committees took TB survey as priorities of their work. For instance, human and material resource for survey and coordination with subjects were performed by them to ensure survey complete successfully.

• Community volunteers participated actively in TB survey teams and played an important role in verification of demographic information of subjects and reminder of subjects not be investigated.
Implementing in field-publicity and mobilization

- Village/neighborhood committees in epidemiological survey sites stick posters in highlight position one week prior to the arrival of TB survey teams.
- Flyers/banners and propagandistic gifts were sent out to residences in TB survey sites
- Pamphlets and flyers were sent out to every household by volunteers in their communities.
Implementing in field-verifying subjects for investigation

- Permanent residents aged 15 years and above (i.e. born before December 31, 1995) in TB survey sites were the subjects.
- Population verification, collation and summarization were conducted by verifying demographic household cards by household in TB survey sites together with related staff of counties/districts and village committees/subdistrict offices one week prior to the start of field survey.
- After the identification of people to be surveyed in TB survey sites, county/district TB control institutions verified and calculated the number of active pulmonary TB patients on treatment among people to be surveyed and submitted the list of patients on treatment to TB survey teams.
Implementing in field-organizing subjects

- All members in village/neighborhood committees were mobilized to arrange persons to be surveyed in TB survey sites.
- Clear and detailed flowcharts of check and examination were developed and posted on obvious corners in TB survey sites and fieldwork order was maintained by specials.
- Inspection volume were adjusted adapting local resident’s schedule, taking advantage of the free time at noon. This greatly enhanced inspection efficiency.
- To facilitate the subjects investigation, shuttle service was made available to rural or disabled subjects.
Rural sites
1. arranged Survey Subjects to be investigated in township hospital or county hospital
2. or shifting X-ray chest van were driven directly into village

Urban sites
1. Shifting X-ray chest van were driven into community
2. Survey Subjects were organized and investigated in hospitals near the survey sites
Knowledge and symptom survey

All survey subjects were interviewed knowledge and symptom survey orderly after they received “examination Sheet for Survey Subject”.

Chest X-ray

After receiving the symptom survey, survey subjects received chest X-ray in the X-ray room orderly.

Preliminary screening of chest X-ray films

All chest X-ray films should be read by the joint diagnostic team.

Simple medical records should be created for survey subjects
Collect Suspected sputum specimens

Doctors should teach the suspected how to provide valid "spot sputum specimen" correctly and distribute two sputum containers to ask them to submit the "overnight sputum specimen" and "morning sputum specimen" to a designated person of the epidemiological survey team in the next day.

Bacteriological examination

Provincial epidemiological survey teams are responsible for sputum smear and culture. The National Reference Laboratory is responsible for strain identification and DST.
Leading team of TB survey arranged experts to monitor fieldwork in Beijing, Hebei, Hunan, Jiangxi, Shandong, Jiangsu and Gansu province respectively where experts responded timely to questions during April to June in 2010.

Province governments were also monitoring activities during survey process.
After the end of field survey, provinces conducted acceptance for original data and databases and solved problems during quality control.
National acceptance was performed in 176 TB survey sites by leading group members, national technical supervisors and members from National office, experts from center of TB Control of China CDC and TB prevention and clinic center from June to July in 2010.
Replying to difficulties and challenges

- Difficulties in collecting permanent resident information in TB survey sites
  - problems:
    - place where residential condition was different with where household registered (family/household separation) due to population floating. Information of Household in Street police station was difficult to reflect the characteristics of the residential status.
    - the resident population information can not be obtained directly from the public security system, -how to solve
  - Solutions:
    - Committees of village/neighborhood and TB survey teams were organized to verify primary demographic information by face to face interview in household.
    - Committees took in charge of communication and professional person had responsibility to inform subjects about TB survey and registered demographic information.
    - And also told the schedule of survey and chest x-ray test notes and provided flyers of survey.
Households verification

- Difficulties:
  - Because of population floating and refusal of investigation, it has some difficulties to go to subjects home to verify demographic information.

- The solution:
  - extending advocacy to mobilize with help of neighborhood / village staff.
RePLYinG TO DIFFICULTIES AND CHALLENGES

• Field organization
  – Difficulties:
    • Because younger persons left for jobs, most of subjects in TB survey sites were elderly persons. Some of these persons had difficulties to walk and communicate. Meanwhile, some TB survey sites were located in the remote areas, far away from the county and the traffic situation worse.
  – Solution:
    • To facilitate the subjects investigation, shuttle service was made available to rural or disabled subjects.
    • checking site were situated in the hospitals near the living places where subjects lived.
Repeating to difficulties and challenges

- examination rate
  - difficulties:
    - Some persons in urban area, especially in big cities such as Beijing, Shanghai, refused to participate in survey. (For example, some subjects refused to take part in the survey even if officers went to their home to persuade them four times)
    - The same case appeared in rural area and some persons lived their place less than 6 months did not want to go back home to be investigated.
  - solution:
    - Repeated campaigns and mobilization, informing the schedule of investigation and arrangements to facilitate survey process.
    - Officers in village/household committees phoned subjects not be investigated to participate.
    - People taking in survey were provided with cash or in-kind subsidies due to raising the enthusiasm of subjects.
    - Reimbursement of traveling expenses back to check point was offered for those persons leaving home less than 6 months.
    - Shifting X-ray examination vehicles were driven directly into the community to facilitate investigation.
Experiences

- Government attention, coordination and cooperation of multi-sectors, effective leadership of public health administration department were KEY point of the successful completion of TB survey.
- Well-developed and feasible working and implementation protocol were developed and a sound organizational structure provided strong protection for the TB survey.
- Financing at all levels and in time provided sufficient funding for the TB survey.
- Experts at all levels and a wealth of experience and hard-working from members and experts of TB survey offered an important guarantee for the quality of survey.
- Effective organization, coordination, propaganda and mobilization from grass-roots organizations was an important factor to make sure completeness of TB survey and examination rate.
- Appropriate incentive mechanism played a positive role to mobilize grass-roots organizations and subjects involved in the TB survey.
- Mobilize all available resources in-depth mobilization, protection of the TB survey smoothly.
• **Responsibility Division**
  - Seminars were held between epidemiological survey teams (EST) and related staff from county, township and village levels. Agreement of objectives, methodology, schedule, requirements for field survey, along with a clear division of responsibilities and indicators were reached in the seminar.

• **Managers Mobilization**
  - Township and village cadres were mobilized to participate in-home inspection, distribution of rewards for all levels of staff.
Experience (1)

- Propaganda
  In order to make villagers understand the meaning and purpose of TBESS, the knowledge of TB prevention and workflow of TBESS were explained clearly by members of epidemiologic survey team (EST)
To enhance villagers’ participation of TBESS, they were told that TB diagnosis and treatment was free of charge and consulting service for other diseases were also provided as well.
Experience (3)

• Incentives
  – Some goods were provided for thanking village participate in the TBESS.
Experience (4)

- Adjustment of Investigation Time
  - Investigation volume were adjusted adapting local resident’s schedule, taking advantage of the free time at night. This greatly enhanced investigation efficiency.

- Leak filled
  - To facilitate the subjects investigation, the elderly and disabled subjects were companioned by members of EST. Physicians in village visited those persons who refused to participate to persuade them to join in.
urban epidemiological sites of Shanghai city—Experience (1)

- **Government leadership**
  - High concern from departments in all level including prefecture and district health administration and CDC, subdistricts administration etc., contributed to a smooth coordination among departments, providing a guarantee to develop the field TB survey.
Experience (2)

• **Organization and mobilization**
  - organizing and mobilizing the epidemiological survey to ensure a survey rate, depended on subdistricts and neighborhood committees.
  - Staff in subdistricts and neighborhood level publicize people to be surveyed in TB survey through various channels.
**Experience (3)**

- **people-oriented**
  - Except for the basic survey content, the TB survey provided CT examination additional to clarify the diagnosis, also provided consulting service for other diseases.
  - More than 300 people which were not the subject to be surveyed were allowed to take part into the survey to make sure their health status, although their screening results were not available for TB survey.
  - Souvenirs were provided to thank for the resident’s participation.
  - Shifting X-ray examination vehicles were driven directly into the community to facilitate investigation.
Thank you!