NATIONAL TUBERCULOSIS PREVALENCE SURVEY 2016

Department of Health/National TB Control Program
Philippine Council for Health Research and Development
Foundation for the Advancement of Clinical Epidemiology, Inc.

2016 NTPS Results
24th Annual PhilCAT Convention
August 17, 2017
Goal of the 4\textsuperscript{th} NTPS

To gain a much better understanding of the burden and trend of disease caused by TB

.... To identify ways in which TB control and care can be improved

......In order to ensure that TB is no longer a public health threat.
Primary objectives

1) To determine the **prevalence of pulmonary TB** (PTB) among the population in the Philippines aged 15 years or older for the period 2016, specifically:
   • AFB smear-positive PTB
   • Xpert MTB/RIF-positive PTB
   • Bacteriologically confirmed PTB (**Xpert MTB/RIF and/or culture**)

2) To assess the **trend in TB prevalence** with smear-positive PTB and bacteriologically-confirmed TB, compared with the results of the 2007 survey;

3) To **contribute to baseline data** for related Sustainable Development Goals and End TB Strategy targets.
National TB Prevalence Surveys, Philippines

1983 prevalence
- Sm +: 6.6/1000
- Cult +: 8.6/1000

1997 prevalence
- Sm +: 3.1/1000
- Cult +: 8.1/1000

2007 prevalence
- Sm +: 2.0/1000
- Cult +: 4.7/1000
National TB Prevalence Surveys, Philippines

1983
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2007
- Sm +: 2.0/1000
- Cult +: 4.7/1000

2016
- ?
Overview of Methods
Sampling
Multi-stage cluster sampling –
* 106 out of 108 clusters
* 3 replacements in Mindanao within the same province
~ 500 eligible participants per cluster (barangay or purok)

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCR / Region III, IVA</td>
<td>40</td>
</tr>
<tr>
<td>Luzon</td>
<td>20</td>
</tr>
<tr>
<td>Visayas</td>
<td>21</td>
</tr>
<tr>
<td>Mindanao</td>
<td>25</td>
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</tbody>
</table>
PREPARATIONS & PILOT PHASE:

FIELD SURVEY & LAB WORK:
Mid-March 2016 to December 2016

LAB WORK & DATA ANALYSIS:
January to July 2017
Survey-eligible population

• 15 years old and above
• Resident of the cluster for at least two weeks
Procedures

• Pre-survey visits and dissemination of info
• Census of clusters
• Informed consent
  ✓ Individual interview
  ✓ Digital chest x-ray
• Sputum collection (if eligible)
• Post-survey advice and treatment (as needed)
New features of the 2016 NTPS SCREENING:

- Symptom screening
  - ≥2 weeks cough
  - and/or
  - Hemoptysis

- Digital chest X-ray

- SPUTUM COLLECTION

AND/OR
New features of the 2016 NTPS DIAGNOSTIC TESTS:

1 - 3 SPUTUM specimens

- Smear microscopy by LED-FM
- Xpert MTB/RIF
- Solid culture for mycobacteria
2016 NTPS Findings
Survey protocol vs. survey accomplishments

- 106
- 108 clusters
- 85% participation
- 76%
- 46,689
- 51,000 sample size
- 15% sputum-eligible
- 39.8%
Outcome of screening process

Total Survey Participants
46,689
100%
Outcome of screening process

- Positively-screened: 18,597 (40%)
- Negative screening: 28,092 (60%)
Outcome of screening process

- Negative screening: 28,092 (60%)
- Chest x-ray only: 10,702 (23%)
- Symptoms only: 1,457 (3%)
- Chest x-ray not done: 5,080 (11%)
- Chest x-ray and symptoms: 1,358 (3%)
Bacteriologically-positive results (N=466)

- Xpert MTB/RIF: 238
- Culture MTB: 69
- Both: 159
27/M, cough < 2 weeks, smoker, no DM, no previous TB treatment
Xpert low MTB detected, no rif resistance
Negative smear
Negative culture

58/M, cough < 2 weeks, smoker, no DM, no previous treatment
Xpert medium MTB detected, no rif resistance
+1 smear
+MTB culture
76/F, cough ≥2 weeks, non-smoker, weight loss, fever, no DM, previous TB treatment (1965)

CXR (3 readings): suspicious for TB, apices; L lower lung field – pneumonic infiltrates or pleural effusion/thickening

Labs: DSSM, Xpert MTB/RIF, culture NEGATIVE

70/F, cough ≥2 weeks, weight loss, fever, non-smoker, no DM, no previous TB treatment

CXR (3 readings): suspicious for TB (fibrohazy or reticular), R apex

Labs: DSSM, Xpert MTB/RIF, culture NEGATIVE
Overall prevalence of bacteriologically confirmed PTB: 1,159 per 100,000 (95% CI: 1,016 – 1,301)
Overall prevalence of smear-positive PTB: 434 per 100,000 (95% CI: 350 – 518)
PTB prevalence by Xpert MTB/RIF: 983 per 100,000 (95% CI: 856 – 1,110)
PTB prevalence by MTB culture: 587 per 100,000 (95% CI: 448 – 687)
Prevalence by sex

1713 per 100,000 (95% CI 1482-1943)

627 per 100,000 (95% CI 516-739)
Prevalence by strata

Strata 1: 1358 (1103-1612)
Strata 2: 1038 (787-1288)
Strata 3: 1234 (873-1594)
Strata 4: 856 (686-1026)
Prevalence to notification ratios for bacteriologically confirmed smear-positive PTB cases

Footnote: Prevalence is for bacteriologically confirmed smear-positive TB cases, 15+ years. Notifications are for all pulmonary smear-positive TB in 2016, 15+ years.
TB prevalence in the 3rd & 4th NTPS
<table>
<thead>
<tr>
<th>Category</th>
<th>2007 survey</th>
<th>2016 survey</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>No. of cases</td>
<td>No. of cases</td>
</tr>
<tr>
<td></td>
<td>as per</td>
<td>as per</td>
</tr>
<tr>
<td></td>
<td>protocol*</td>
<td>amended</td>
</tr>
<tr>
<td>Bacteriologically confirmed TB</td>
<td>136</td>
<td>81 (72**)</td>
</tr>
<tr>
<td>Culture-positive MTB</td>
<td>-</td>
<td>81 (72**)</td>
</tr>
<tr>
<td>Smear-positive MTB</td>
<td>50</td>
<td>36 (33**)</td>
</tr>
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*Amended analysis* restricted to the following criteria:

- Eligibility to participate criteria
  - 2007 survey: ≥15yrs (N=19,341)
  - 2016 survey: ≥15yrs and residency status (N=61,467)
- Participation defined by:
  - 2007 survey: Had a CXR (N=17,226)
  - 2016 survey: Had an interview +/- CXR (N=46,689)
- Screening outcomes defined by chest X-ray result only i.e. symptom screening excluded
- TB cases are defined by Ogawa culture result only i.e. LJ excluded. In the 2007 survey, the second sputum specimen result was used and where it was missing or contaminated, the first specimen result was used instead.

**Source:** final survey report. Smear-positive TB cases only includes those with a positive TB culture (i.e. 5 probable cases were excluded). Some IDs from the 2007 laboratory database could not completely merge/match with the main database, and some cases were also excluded because the participant was not eligible to submit samples based on CXR screening (i.e. submitted but not eligible to do so).
Adjusted prevalence estimates for 2007 and 2016: No evidence of decline

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<th>2007</th>
<th>2016</th>
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<tr>
<td>Culture-positive TB cases</td>
<td>463 per 100,000</td>
<td>512 per 100,000</td>
</tr>
<tr>
<td></td>
<td>95% CI 333-592</td>
<td>95% CI 420-603</td>
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<tr>
<td>Smear-positive with</td>
<td>193 per 100,000</td>
<td>286 per 100,000</td>
</tr>
<tr>
<td>culture-positive TB</td>
<td>95% CI 117-269</td>
<td>95% CI 223-349</td>
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• ≥15yrs age group
• Screening by chest X-ray only
• Bacteriologically confirmed TB cases are defined by Ogawa culture only

• Analysis: multiple imputation + inverse probability weighting (20 cycles)
• 2007 survey variables: age, sex, age_sex_interaction, strata, chronic cough, coughing blood, central CXR result, past treatment of TB
• 2016 survey variables: age, sex, strata, chronic cough, coughing blood, fever, weight loss, night sweats, field CXR result, central CXR result, past treatment of TB, current treatment of TB, currently smoking tobacco.
Trends between the 2007 and 2016 national TB prevalence surveys of the Philippines

Culture-positive TB

Prevalence per 100,000 population

Year


Smear-positive TB

Prevalence per 100,000 population

Year

Factors associated with TB
Significant risk factors

Adjusted odds ratios (95% CI)

Age
- 25-34 y/o: 2.2 (1.6, 3.2)
- 35-44 y/o: 2.2 (1.5, 3.4)
- 45-54 y/o: 2.8 (1.8, 4.4)
- 55-64 y/o: 1.6 (1.2, 2.0)
- 65 y/o and above: 2.3 (1.7, 3.1)

Urban dwelling
- Urban dwelling: 1.6 (1.2, 2.0)

Previous TB treatment
- With previous TB treatment: 1.7 (1.1, 2.6)

Self-reported diabetes mellitus
- With diabetes (self-reported): 1.6 (1.1, 2.6)

Lower socioeconomic status
- 4Ps or conditional cash transfer: 1.8 (1.4, 2.3)

No health insurance
- Without health insurance: 1.9 (1.3, 2.7)

Sex and smoking
- Females, 1-5 pack years: 2.3 (1.6, 3.3)
- Males, non-smokers: 3.3 (2.7, 4.1)
- Males, 1-5 pack years: 3.5 (1.9, 6.3)
Health-seeking behavior: Aug. 18, 2017
PhilCAT lunch symposium
Short-term recommendations

• Do systematic screening for TB among high-risk and vulnerable groups.
• The tools to find the missing TB cases must be sharpened and enhanced.
• Develop innovative behavioral interventions and enablers to improve health care-seeking and adherence to treatment.
• Reinvigorate and transform PPM partnerships.
• Strengthen the collaboration between the NTP and other health programs.
Long-term recommendations

• Develop adequate social protection strategies and PhilHealth TB benefit packages.
• Vigorous advocacy to increase investments local, national, and international investments to address the TB burden, including quality patient-centered and community-based strategies and health systems strengthening.
• More comprehensive and sustained poverty alleviation efforts and multi-sectoral partnerships at the local and national levels.
A multi-agency effort:

- DOH/NTP and NTP partners
- PCHRD
- Technical assistance from WHO
Multi-agency effort (2)

Implementers:

• Foundation for the Advancement of Clinical Epidemiology, Inc.
• Foundation for the Control of Infectious Diseases, Inc.
• Philippine College of Radiology

Network of TB laboratories:
• National TB Reference Laboratory, Alabang
• Cebu TB Reference Laboratory
• Davao TB Reference Laboratory
• Northern TB Reference Laboratory
• Region 2 TB Reference Laboratory
• TB Medical Research Laboratory, Philippine General Hospital

In cooperation with the University of the Philippines Manila
With the cooperation of regional, provincial, & local officials, health staff, local volunteers, communities
Thank you!
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- **2016**
  - Sm +: 2.9/1000
  - Cult +: 5.1/1000

DSSM, Xpert MTB/RIF + culture

2016

Sm +: 4.3/1000
Xpert/cult +: 10.6/1000