Tuberculosis control among high risk and vulnerable populations

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“The best way to predict the future is to create it”
– Peter F Drucker

Nobu Nishikiori, MD, PhD, MSc
Medical Officer, Stop TB
WHO Western Pacific Regional Office
nishikiorin@wpro.who.int

Tuberculosis – a social disease

World Health Organization, Western Pacific Regional Office
Are we doing any better now?

TB control in the Western Pacific Region

Stop TB Special Project (2000 – 2010)

Regional Plan 2000-2005

Regional Plan 2006-2010

Regional Plan 2011-2015

Intermediate targets
70% Case Detection
85% Treatment success
100% DOTS Coverage

Impact targets
“50/50”

MDG Reverse
“50/50”

TB Crisis

Still too many TB patients undiagnosed

- Case detection stagnating
- TB concentrates among high risk populations
- Emerging challenges
  - Migrants
  - Urban poor
  - Emerging risk factors
    - Aging, tobacco, diabetes
  - Increasing private sector role and diverse treatment seeking
- Low diagnostic sensitivity
Diagnostic sensitivity too low

- Symptom screening + microscopy → detect only 19%
- 60% of TB cases would be missed without X-ray screening

Need for more sensitive diagnostics

- More sensitive diagnostics

- Liquid culture 10-100/ml
- LAMP 50-150/ml
- Line-probe assay 10,000/ml
- Automatic NAAT (Xpert) 50-150/ml
- LED Microscopy 10,000/ml
Xpert™ MTB/RIF (GeneXpert)

- TB diagnosis
- Rif resistance

2 hrs from sputum specimen

Actions for improved case detection

- Minimizing physical, financial and social barriers
- Healthcare utilization
- Engaging all care providers
- Improved diagnostic tools
- Improved reporting system
- Improved health communication
- Patient pathway

Active TB

- Contact investigation
  - Children
  - Household
  - Workplace

Clinical risk groups
- HIV
- Smokers
- Diabetics
- Previous TB
- Malnourished
- Drug abusers

Risk populations
- Prisoners
- Urban poor dwellers
- Migrants
- Workplace (HCW)
- Elderly

TB Diagnosis

Notification

Regional Strategy to Stop TB in the Western Pacific (2011-2015), WHO/WHO
Adapted and modified from: “Action framework for higher and earlier TB case detection”, WHO
TB high groups

• Increasing case detection
• Reducing transmission through early detection
• Mitigating institutional amplifiers

Vulnerable and marginalized
• Service delivery to increase access to quality care
• Addressing health inequity
• Expanding health system reach through TB programme

TB high risk and vulnerable populations
TB contact investigation (CI)

- Overall yield from a literature review (low and middle income):
  - 4.5% for all TB
  - ~2% for bacteriologically confirmed
  - High yield among children
- Heterogeneity among studies
- Yield might be lower in intermediate burden settings in the Region
  - 1.99% in Hong Kong (Noertjojo, Tam, et al, 2004)
  - 0.93% in Singapore (Chee, et al, 2004)
  - 1.14% in Singapore (index cases from correctional facilities, Chee, et al, 2004)
- Nevertheless, in-depth yield analysis might be useful
- LTBI treatment for close contacts esp children ➔ a key for

Diabetes

- TB risk (relative to general pop)
  - 2-3 times higher
  - Dose response: poor control ➔ higher TB risk
- Delayed sputum conversion, death during TB treatment, and relapse

TB-DM collaborative framework

Diabetes clinic

Case finding:
• Intensify detection of TB among DM patients
Care delivery:
• Ensure TB infection control
• Ensure high quality TB treatment and management
Outcome:
• Better control for DM by detecting and treating TB early

Establish mechanisms for collaboration

TB DOTS clinic

Case finding:
• Screen TB patients for diabetes
Care delivery:
• Ensure high quality diabetes management
Outcome:
• Better TB cure, less relapse by controlling DM

Effective Referral and coordination

(Stop TB, WHO WPRO, based on “Collaborative Framework for Care and Control of Tuberculosis and Diabetes”, WHO/IUATLD, 2011)

People living with HIV

• TB risk (relative to general pop)
  – 20-30 times higher
  – Progressive increase as CD4 ↓
• HIV worsens TB treatment outcomes and increases risk of death
• ART reduces risk of poor TB treatment outcomes
• Intensified TB case finding in 3 I’s
• What is the current level of TB case detection (esp systematic TB screening)?
Tobacco smokers

- TB risk (relative to general pop)
  - Active smoking: 1.5-3 times higher
  - Passive smoking also increase the risk

Cumulative hazards for active TB by smoking status, among a cohort of clients (>65yrs) registered with an elderly health service in Hong Kong


Elderly

- Changes in population structure – rapid aging
- A higher TB disease burden carried by older population
  → Doubled impact

- Effective entry points?
  - ? Institutions
  - ? Health care package

Increasing proportion of super-elderly (>80y/o) among TB patients

(Statistic of TB, JATA/MOHLW, Japan)
Prison TB control

Keys to successful control:
✓ Political commitment
✓ Strong entry screening
✓ Early case detection with timely and quality diagnostics
✓ Infection control and improved living conditions
✓ Monitoring the epidemiological situation
✓ Monitoring DR-TB rates
✓ Operational research (periodical assessment)

Migration: diverse populations, diverse issues

Internal migrants
- Rural to large cities
- Issues: access to services, care delivery

Cross-border population movement
- Mostly economically driven
- Issues: legal issues, high-risk behaviours, health access and care delivery

Floating population
- Homelessness, urban slums, mining communities, etc
- Issues: access to services, care delivery

Labour immigration
- Endemic to less endemic countries
- Issue: importation of infectious diseases, international referral, access to services
Migrant TB burden in Malaysia
Number and % of migrant among all TB cases, by State, 2008

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
<th>% of Migrant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sabah</td>
<td>355</td>
<td></td>
</tr>
<tr>
<td>Selangor</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>Johor</td>
<td>375</td>
<td></td>
</tr>
<tr>
<td>Kuala Lumpur</td>
<td>262</td>
<td></td>
</tr>
</tbody>
</table>

(Data source: NTP Malaysia)

Cambodian irregular migrants in Thai border area

- Some 98,000 Cambodian migrants deported from Thailand and Malaysia to Poipet in 2010
  - 20% spent > 1 month in detention centres in Thailand
- No systematic health screening
- Many stay in the border areas while others go back to the communities
- A large scale joint project (WHO, NTP, IOM, border police, provincial health) to be embarked for provision of TB services

(Data source: NTP Malaysia)
How TB risk factors can be used in TB control/policy?

How to use TB risks in programming (1)

- **Estimating the magnitude**
  - Prevalence of risk factors
  - Strength of the risk on TB
  - Population attributable risk fraction (PAF)

  → Contribution of the risk factors on the TB epidemic
  → Does not necessarily mean to tackle the factor with a large PAF

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Prevalence</th>
<th>RR</th>
<th>PAF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>28.1%</td>
<td>2.6</td>
<td>31.0%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>9.7%</td>
<td>2.5</td>
<td>12.8%</td>
</tr>
<tr>
<td>Prisoners</td>
<td>0.12%</td>
<td>20.0</td>
<td>2.2%</td>
</tr>
<tr>
<td>HIV</td>
<td>0.014%</td>
<td>26.7</td>
<td>0.4%</td>
</tr>
<tr>
<td>Elderly</td>
<td>12.3%</td>
<td>2.0</td>
<td>10.9%</td>
</tr>
</tbody>
</table>
How to use TB risks in programming (2)

- Upstream determinants vs downstream risk factors
  - e.g. addressing poverty vs targeted service delivery for homeless
  - e.g. advocate for smoking reduction vs smoking cessation among TB patients

- Use of risk markers for targeted service delivery
  - e.g. ACF in urban slum
  - e.g. ACF among homeless

- Potential impact on TB epidemics
  - e.g. targeted population likely produce more secondary cases (urban slums, prisons, etc)

Neighbourhood factor analysis and targeted interventions
Targeted case finding approaches require specific measures to provide care

- High risk populations require a tailored service delivery mechanism
  - e.g. Migrants / urban poor
    - highly mobile / high default and transfer
    - Social and financial insecurity
  - e.g. Prisons
    - High co-morbidity including HIV (what if ARV is not available?)
    - Transfer and referral system (release screening?)

| Treatment outcome of new smear positive TB by residence status, Beijing, 1997-2002 |
|---------------------------------|-----------------|
| Permanent Residents (N=5915)    | Migrants (N=2423) |
| Completed                       | 39%             |
| Cured                           | 11%             |
| Died                            | 37%             |
| Defaulted                       | 13%             |
| Transferred                     | 39%             |

Cases among migrants (up to 20%)

Summary

- TB control among high risk populations is a new front-line to further accelerate TB control
- It also opens up doors for public health interventions to address health inequities
- Identifying and prioritizing TB high risk populations require country specific epidemiological analysis, strategic decision, partnership beyond the health sector
- WHO WPRO committed to play a vital role in facilitating the exchange of experiences, providing guidance and catalyzing innovations