TB Infection Control: Accomplishments, challenges, and setting priorities

16th Core Group Meeting of the TB/HIV Working Group
May 26-28, 2010
Almaty, Kazakhstan

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Acknowledgements

- Rose Pray – WHO
- Paul Jensen – CDC/DTBE
- Ed Nardell – Harvard/PIH
- Rod Escombe – Imperial College, London
- Max Meis – KNCV
- Nonna Turusbekova – KNCV
- Cheri Vincent – USAID
- Ginny Lipke – CDC/GAP
- Courtney Coleman – CDC/GAP
Outline

- The problem
- Accomplishments
- Challenges
- Priorities
Top priorities for infection control in Central Asia

- Increase focus on protecting health workers from TB.
- Minimize hospital stay of TB patients, even MDR TB patients once stabilized.
- Strengthen DOTS in prisons.
HIV prevalence among TB cases, 2007

Global estimate: about 1.4 million TB/HIV cases and 456,000 TB/HIV deaths a year
MDR-TB % among new cases, 1994-2007

* Sub-national coverage in India, China, Russia, Indonesia.

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Countries that had reported at least one XDR-TB case by September 2009

Argentina, Armenia, Australia, Azerbaijan, Bangladesh, Belgium, Botswana, Brazil, Burkina Faso, Canada, China, Colombia, Czech Republic, Ecuador, Estonia, France, Georgia, Germany, India, Iran (Islamic Rep. of), Ireland, Israel, Italy, Japan, Kenya, Latvia, Lesotho, Lithuania, Luxembourg, Mexico, Mozambique, Myanmar, Namibia, Nepal, Netherlands, Norway, Oman, Pakistan, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Slovenia, South Africa, Spain, Swaziland, Sweden, Thailand, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uzbekistan, Viet Nam.
## Excess Occupational Risk

<table>
<thead>
<tr>
<th>Work location</th>
<th>TB incidence rate ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(relative to general population TB incidence rate)</td>
</tr>
<tr>
<td>Outpatient facilities</td>
<td>4.2 – 11.6</td>
</tr>
<tr>
<td>General medical wards</td>
<td>3.9 – 36.6</td>
</tr>
<tr>
<td>Inpatient facilities</td>
<td>14.6 – 99.0</td>
</tr>
<tr>
<td>Emergency rooms</td>
<td>26.6 – 31.9</td>
</tr>
<tr>
<td>Laboratories</td>
<td>42.5 to 135.3</td>
</tr>
</tbody>
</table>

# Increased risk of TB in high risk populations

<table>
<thead>
<tr>
<th>Population</th>
<th>Outcome</th>
<th>Settings</th>
<th>Studies</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Members</td>
<td>TB infection &amp; TB</td>
<td>Low income</td>
<td>7</td>
<td>1.73</td>
</tr>
<tr>
<td></td>
<td>TB infection &amp; TB</td>
<td>High income</td>
<td>15</td>
<td>3.19</td>
</tr>
<tr>
<td>Health care workers</td>
<td>TB infection</td>
<td>Low income</td>
<td>9</td>
<td>5.77</td>
</tr>
<tr>
<td></td>
<td>TB infection</td>
<td>High income</td>
<td>40</td>
<td>10.06</td>
</tr>
<tr>
<td></td>
<td>TB</td>
<td>Low income</td>
<td>37</td>
<td>5.71</td>
</tr>
<tr>
<td></td>
<td>TB</td>
<td>High income</td>
<td>15</td>
<td>1.99</td>
</tr>
<tr>
<td>Prisoners</td>
<td>TB infection</td>
<td>High income</td>
<td>5</td>
<td>2.74</td>
</tr>
<tr>
<td></td>
<td>TB</td>
<td>High income</td>
<td>18</td>
<td>21.41</td>
</tr>
</tbody>
</table>

Source: WHO, 2008
Accomplishments

- TB Infection Control subgroup formed Nov. 2006
- Policy document published
- Advocacy document finalized
- Human resource development, trainings, TA
  - Program managers
  - Engineers/architects
- Tools for facilities
- Journal articles, symposia at international meetings
Pending

• Cost Study
• Framework/workbook
• Standards and specifications of TB IC equipment
• Case design book
2009 WHO TB Infection Control Policy

- Addresses health facilities, congregate settings and households
- Adds a managerial component at the national and facility level
- Promotes the role of the civil society in designing, implementing and evaluating TB IC
- Promotes synergies between TB infection control and general infection control, and with the health system
- Emphasizes community involvement in raising awareness, promoting behavior change, reducing stigma
- Recommends a combination of controls based on facility assessments
Managerial Activities

- Identify or strengthen a coordinating body
- Develop a comprehensive and budgeted plan
- Ensure health facility design, construction or renovation
- Promote quality and timely lab services
- Conduct surveillance for TB disease among HCWs
- Address advocacy, communication and social mobilization
- Conduct monitoring and evaluation
- Enable operational research
Administrative Controls

1) Triage
2) Separation
3) Promote cough etiquette
4) *Minimize time in health care settings*
Cough Etiquette
Environmental Controls

- Promotion of natural ventilation
- Use of mixed ventilation systems
- Use of ultraviolet germicidal irradiation (UVGI) fixtures, at least when adequate ventilation cannot be achieved
Natural Ventilation

Plan of Respiratory wards, Santa Rosa 3

Unoccupied ward

General respiratory ward

Office

Nurses

Balcony

Balcony

Drug-sensitive TB

MDR-TB

Isolation room

Plan of Respiratory wards, Santa Rosa 3

Unoccupied ward

General respiratory ward

Office

Nurses

Balcony

Balcony

Drug-sensitive TB

MDR-TB

Isolation room
Use of Open Air Spaces
Mechanical Ventilation

- Created by using a fan to force air exchange and to drive air flow
- Works by generating negative pressure in the room to drive airflow inward

To be effective, it is essential that:
- All doors and windows kept closed
- A minimum of 12 ACH is maintained
- The ventilation system is well-designed, maintained and operated
Mixed Mode Ventilation

- Combines the use of mechanical and natural ventilation
- Is done through the installation of an exhaust fan to increase the rate of air changes in the room
- Can be useful in places where
  - natural ventilation is not suitable (e.g. very cold weather)
  - fully mechanically ventilated rooms are not available
Routine Monitoring, Recording

- The operation of ventilation systems should be regularly monitored
- Is the air moving? Is it moving in the right direction?
- Record performance and dates of all routine monitoring activities
Personal Protective Equipment

- Recommended for hcw when caring for patients or suspects with infectious TB

- Especially
  - during high-risk aerosol-generation procedures
  - when providing care to infectious MDR-TB and XDR-TB patients or suspects
Congregate Settings

- Avoid overcrowding
- **Focus on DOT in prisons.**
- Be part of the national planning and assessment of facilities.
Implementation Activities

- Situational analyses
- TA on development of TB IC policies/strategic plans
- TA on implementation in hospitals (MDRTB hospitals), outpatient facilities, clinics
- How to get started in facilities.
- TA on specific ventilation issues
- Identification of infection control focal points
- Networking with other infection control efforts
Reduce Crowding

Large facility 2% risk = 98 exposed
10 small facilities 2% risk = 18 exposed
Now 80 protected.

98 patients exposed vs. 9 + 9 = 18
## Infection Control Trainings (TBCAP)

35 trainings/courses by region  
(2007 – Nov 2009)

<table>
<thead>
<tr>
<th>Int’l</th>
<th>Nat’l</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>9</td>
<td>Eastern Europe/Central &amp; Asia</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td>-</td>
<td>5</td>
<td>Latin America and the Caribbean</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>High Income Countries</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>South-East Asia &amp; Western Pacific</td>
</tr>
<tr>
<td>1</td>
<td>-</td>
<td>Eastern Mediterranean</td>
</tr>
</tbody>
</table>
Participants in Trainings

- 1332 persons trained
- 2/3 employed by MOH or NTP, labs (medical)
- 15% engineers & architects
Building Design and Engineering  
Approaches to Airborne Infection Control  
Harvard Course  

- 2-week course given annually (Ed Nardell and Paul Jensen, coordinators)  
- 70 persons trained in 2 courses  
- Emphasis on building/facility design, ventilation options, UVGI  
- 2010 course will include Russian translator
Case Design Book

- Being prepared by graduates from the Harvard course on engineering methods for the control of airborne infection...class of 2008
  - Examples of facility designs with adequate ventilation, in different climatic conditions
  - Use of outdoor spaces, when feasible
  - Simple examples of the use of prevailing winds, cross ventilation, and space.
Implementation Framework

- How to implement the 12 elements of the TB IC policy
  - Best practice examples
  - Example of roles and responsibilities
  - Tools
  - Checklists
  - Sample IEC materials
Challenges to Implementing TB Infection Control Best Practices

• Lab systems are often weak
• Evidence for best practices is weak or lacking
• IC approach often not well-understood
• Not enough technical consultants
• Legal/ethical dilemma between patients’ rights and public health
More Challenges to Implementing TB Infection Control Best Practices

- Require behavior change and ongoing monitoring
- Long hospitalizations of TB patients/suspects, MDR patients, increases problem
- IC interventions can be expensive
- Prison practices focus on security
- Stigma of TB, M/XDR TB
My Priorities for Scale-up

• Focus on health care workers
  - Occupational health, rights for hcw's, annual monitoring, screening for TB, TST's
  - Assist with surveillance for TB among hcw's

• Identify and promote a few simple indicators
  - TB in HCW (?)
  - Hospital length of stay (?)
  - Include in HIVQUAL programs

• Train more engineers/industrial hygienists

• Promote partnerships/identify resources
  - Use influenza pandemic preparedness
  - Work with community action groups
  - Link with ICN, IFIC, IDSA, APIC
  - Link with health system strengthening initiatives
Top priorities for infection control in Central Asia

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