The Global Epidemiology of Tuberculosis

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Tuberculosis: A Global Emergency

- One third of the world’s population is infected
- TB kills one person every 17 seconds, 2 million each year; 98% in developing world
- 9 million new cases, 80% in 22 high-burden countries
- Multidrug-resistant TB threatens TB control
- TB/HIV coinfection: a growing syndemic
- 53% of TB cases in the US are in foreign-born
Overview

- Global epidemiology
- TB among the foreign-born in the United States
- Global control strategy
- US involvement
Leading Causes of Mortality from Infectious Diseases, 2001

- Respiratory infections: 3.9* millions
- AIDS: 2.9 millions
- Diarrheal diseases: 1.9 millions
- Tuberculosis: 1.6 millions
- Malaria: 1.1 millions

*in millions

Source: WHO/CDS/2003.15
Downward Trends in TB Incidence: Several Regions of the World

- Industrialized
- South East Asia
- Western Pacific
- Latin America
- Eastern Mediterranean
Upward Trends in TB Incidence: African and Ex-Soviet Countries

- Africa - low HIV
- Africa - high HIV
- ex-Soviet
Estimated TB Cases, by Country, 2000

High-Burden Countries (HBCs), 2002

1. India  
2. China  
3. Indonesia  
4. Nigeria  
5. Bangladesh  
6. Pakistan  
7. Ethiopia  
8. Philippines  
9. South Africa  
10. DR Congo  
11. Russia  
12. Kenya  
13. Viet Nam  
14. Tanzania  
15. Brazil  
16. Uganda  
17. Zimbabwe  
18. Mozambique  
19. Thailand  
20. Afghanistan  
21. Cambodia  
22. Myanmar

WHO/HTM/TB/2004.331
## Estimated Incidence of TB in Selected HBCs, 2002

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (millions)</th>
<th>Cases (thousands)</th>
<th>Rate x10⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. India</td>
<td>1,049</td>
<td>1,761</td>
<td>168</td>
</tr>
<tr>
<td>2. China</td>
<td>1,294</td>
<td>1,459</td>
<td>113</td>
</tr>
<tr>
<td>3. Indonesia</td>
<td>217</td>
<td>557</td>
<td>256</td>
</tr>
<tr>
<td>8. Philippines</td>
<td>78</td>
<td>251</td>
<td>320</td>
</tr>
<tr>
<td>11. Russia</td>
<td>144</td>
<td>182</td>
<td>126</td>
</tr>
<tr>
<td>17. Zimbabwe</td>
<td>13</td>
<td>88</td>
<td>683</td>
</tr>
<tr>
<td>20. Afghanistan</td>
<td>23</td>
<td>76</td>
<td>333</td>
</tr>
<tr>
<td>21. Cambodia</td>
<td>14</td>
<td>76</td>
<td>549</td>
</tr>
</tbody>
</table>
Estimated TB Incidence Rates, 2003
HIV Prevalence in Adults, 2003

38 million people [range: 35-42 million] living with HIV as of end 2003

HIV Is Changing Global TB Epidemiology

Reported Case Rate (per 100,000)

- Botswana
- Zimbabwe
- Malawi
- Tanzania
- Ivory Coast
Dynamics of TB and HIV in Uganda

TB incidence/100,000

HIV prevalence adults (%)

- TB
- HIV-national
- HIV-Kampala

Years:
- 1975
- 1980
- 1985
- 1990
- 1995
- 2000
Multidrug-Resistant TB

- Continues to threaten global TB control
- Short-course therapy ineffective
- Danger of increasing drug resistance, given the length of drug development timelines
Reported TB Cases
United States, 1982-2003
Trends in TB Cases in Foreign-born Persons, United States, 1986-2003

- No. of Cases
- Percentage of Total Cases

CDC
Primary MDR TB in U.S.-born vs. Foreign-born Persons, United States, 1993-2003

Note: Based on initial isolates from persons with no prior history of TB. MDR TB defined as resistance to at least isoniazid and rifampin.
Countries of Birth for Foreign-born Persons Reported with TB United States, 2003

- Mexico (26%)
- Philippines (12%)
- India (8%)
- Viet Nam (8%)
- China (5%)
- Haiti (3%)
- S. Korea (2%)
- Other Countries (36%)
TB Clusters Among Foreign-born in the United States, 2000-2005

- Laotian refugees, CA
- East Africans, WA
- Marshall Islanders, AR
- Vietnamese fishermen, AL
- Mexican poultry workers, DE
The WHO Global TB Control Strategy

• Directly observed treatment, short-course
  – Abbreviated “DOTS”

• National case management of populations

• March 1997, World Health Assembly declared:
  “[DOTS] represents the most important public health breakthrough of the decade, in terms of the lives which will be saved”
WHO DOTS Strategy for TB

1. Government Commitment to TB control
2. Microscopy-based Case Identification
3. Standardized Short Course Chemotherapy under DOT
4. Secure Supply of Quality Drugs
5. Case Registry, Monitoring & Evaluation

Rx
2HRZE(S)/4HR
DOTS Is Effective

- In China, DOTS led to a 48% decrease of pulmonary TB from \(573/100,000\) to \(298/100,000\)
- In Leningrad Region, DOTS led to a treatment success rate of 71% in the 1st year
- Eleven HBCs met or exceeded 80% treatment success
- In India, DOTS led to cure rates > ~80%
- In Botswana, DOTS prevented drug resistance

Status of DOTS Globally, 2002

• WHO StopTB: significant momentum
• 180/210 (86%) countries implementing DOTS
• 69% world’s population had access to DOTS
• All 22 HBCs have adopted DOTS
• Vietnam is only HBC meeting case detection (75%) and treatment success (80%) targets
Progress towards 70% case detection

Cases notified under DOTS (%)

WHO target 70%

accelerated progress: target 2005

DOTS begins 1991

average rate of progress: target 2013

WHO, 2000
Can TB Be Controlled Globally?

Six most common constraints among HBCs:

1. Lack of qualified staff
2. Poor monitoring and evaluation
3. Inadequate infrastructure
4. Weak laboratories
5. Role of private and non-NTP providers
6. Limited commitment to and capacity for DOTS in peripheral health services
Additional Constraints to Global TB Control

• Limited access to DOTS/ Limitations of DOTS

• Increasing TB/HIV coinfection

• MDR TB

• Insufficient funds
Stop TB Partnership Framework

STOP TB PARTNERS’ FORUM

Global Drug Facility (GDF)  Coordinating Board Partnership Secretariat  WHO Strategy & Technical Advisory Group

National Regional Global
DOTS Expansion  TB/HIV  DOTS-Plus MDR-TB  TB Drug R&D  TB Diagnostics R&D  TB Vaccine R&D

WORKING GROUPS

TASK FORCES: ADVOCACY & COMMUNICATIONS / FINANCING
“Enhanced DOTS”

- TB/HIV
- MDR TB
- Private Public Mix
The President’s AIDS Initiative (PEPFAR)

• Five year, $15 billion initiative to combat the global AIDS crisis

• Technical support for 8/15 PEPFAR countries
  – Botswana, Ethiopia, Guyana, Haiti, Mozambique, Rwanda, South Africa, Viet Nam

• Technical support for other GAP countries
  – Thailand, Brazil, Cambodia, India
Basic TB/HIV Policy and Guidelines

Interim Policy Guidelines   M&E   Surveillance

ART   TBHIV Clinical Manual   HIV testing policy

http://www.who.int/gtb/whats-new/new_publications.htm   http://www.who.int/hiv/pub
US Involvement in Global TB Control

- Global Fund to Fight AIDS, TB, and Malaria
- USAID
- OGAC
- NIH
- CDC
- NGOs
TB Coalition for Technical Assistance

• 6-member panel of expert TB organizations
  – WHO, CDC, KNCV, IUATLD, ALA, ATS

• Provides access to technical experts and assistance for USAID country missions requesting in-country support for TB

• Established by USAID Global Bureau for missions to program TB funds with user-friendly mechanism

• PMU based at KNCV in Den Haag, Netherlands

* TB Coalition for Technical Assistance
CDC Contributions to Global TB Control

• Experience and expertise in TB, MDR, and TB/HIV
• Leadership, enthusiasm, “can-do” attitude
• Ability to broker resources, both financial (USAID, foundations) and human (CDC, partners)
• Commitment to capacity-building
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