

Incidence of Extensively Drug Resistant Tuberculosis (XDR-TB), a drug-resistant form, among Burmese Migrant Workers, Mae Sot Thai-Burma Border

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XDR-TB

- XDR-TB is the abbreviation for extensively drug-resistant tuberculosis (TB).
- XDR-TB can develop when the second-line drugs are also misused or mismanaged.
- If these drugs are misused or mismanaged, multidrug-resistant TB (MDR-TB) can develop.

Difference between Multiple Drug Resistant Tuberculosis (MDR-TB) Extensively Drug Resistant Tuberculosis (XDR-TB)

- MDR-TB is due to bacteria that are resistant to at least Isoniazid and Rifampicin, the two most powerful first-line anti-TB drugs.
- XDR-TB is due to bacteria that are resistant to any fluoroquinolone, and at least one of three injectable second-line drugs (capreomycin, kanamycin and amikacin), in addition to isoniazid and rifampicin.



- **General Objective**

- To review the situation at the present of extensively drug resistant tuberculosis at the global, regional and among the vulnerable group like Burmese migrant workers in Thai-Burma boarder.

- **Specific Objective**

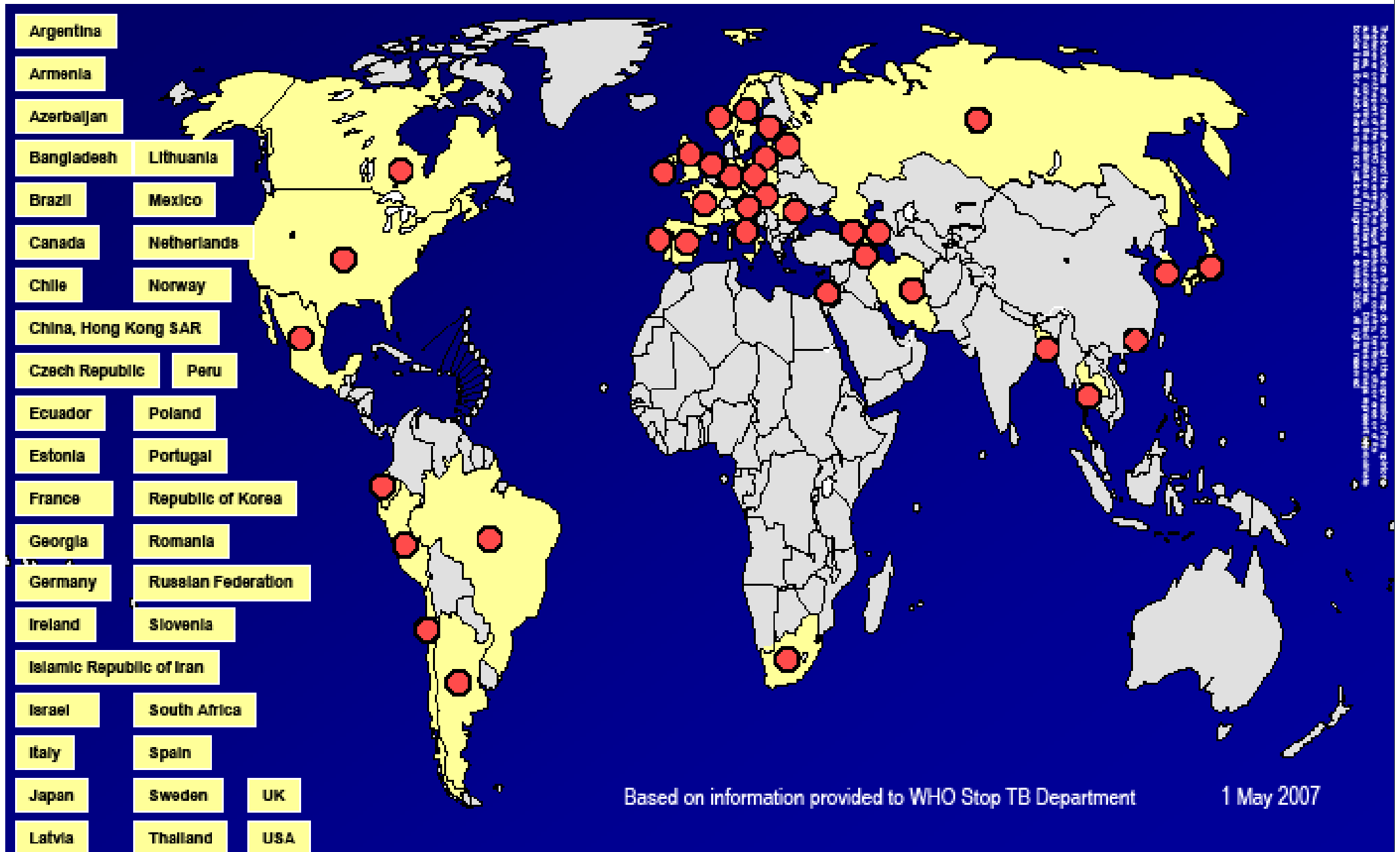
- To review the statistics of TB and extensively drug resistant tuberculosis
- To review the etiology of extensively drug resistant tuberculosis
- To review, successfulness, and failure of TB prevention program
- To explore gap and challenge of research regarding extensively drug resistant tuberculosis

Methodology

- This study applied a technique of systematic review of all relevant articles.
- This systematical review comprises of 4 parts;
 - incidence of TB and XDB TB
 - etiology of XDB TB
 - prevention program on TB and
 - gap and the challenging of research on XDB TB.

Countries with XDR-TB

Confirmed cases to date



The locations and numbers shown on this map do not reflect the spread of drug-resistant tuberculosis, or concerning the distribution of tuberculosis. Global Health Map - World Health Organization. Source: WHO. All rights reserved.

Emergence of XDR-TB

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World TB Day — March 24, 2006

World TB Day is March 24. This annual event commemorates the date in 1952 when Robert Koch announced his discovery of *Mycobacterium tuberculosis*, the bacterium that causes tuberculosis (TB). Worldwide TB remains one of the leading causes of death from infectious disease. An estimated 2 billion people live, one third of the world's population, are infected with *M. tuberculosis*. Each year approximately 9 million persons become ill from TB, and approximately 2 million die as a result. World TB Day provides an opportunity for TB programs, community organizations, and other partners to draw attention to TB-related problems and solutions and to support TB control activities.

During 1985–2004, there were 20 years in which the number of TB cases reported in the United States increased by 100%. This increase is generally associated with TB resistance to previously effective drugs, which began in the mid-1980s. Although the 2005 TB rate was the lowest recorded in the United States since national reporting began in 1953, the average annual decline has slowed during the past 5 years, and drug-resistant TB remains a threat, especially among TB patients having contact with and living in high-risk populations.

Major national drug resistance programs organized by local TB coalitions in recognition of World TB Day for example, the Georgia Department of Human Services, Division of Public Health, Tuberculosis Program, is having an observance recognizing the serious situation resulting in massive departures in TB among blacks in the Atlanta area. Additional information about World TB Day and XDR-TB is available on the following Web sites: <http://www.cdc.gov/dpdx/WorldTBDay/index.htm>.

Emergence of *Mycobacterium tuberculosis* with Extensive Resistance to Second-Line Drugs — Worldwide, 2000–2004

During the 1990s, multidrug-resistant (MDR) tuberculosis (TB) affected persons in almost all countries, especially in those with high TB burden. In the United States (1) and elsewhere (2), MDR treatment requires the use of second-line drugs (SLDs) that are less effective, more toxic, and more than 10 times more costly than first-line drugs (3). In 2000, the Stop TB Subcommittee Green Light Committee was created to increase access to SLDs available at the existing 100-cent program to prevent, control, and cure TB (4). While existing MDR-TB control programs worldwide do not routinely monitor or report on multiple cases of TB with extensive resistance to SLDs, to assess the frequency and distribution of extensive drug resistance (EDR) in cases of TB and the World Health Organization (WHO) surveyed an international network of TB laboratories. This report summarizes the results of this survey, which described drug-resistant TB during 2000–2004, of 17,690 TB isolates, 20% were MDR-TB and 2% were XDR-TB. In addition, preliminary results are

1. World Health Organization. *Global tuberculosis control: epidemiology, prevention, and control: the strategy to eliminate tuberculosis, including drug resistance*. Geneva: WHO, 2004.

NOTE

1. Centers for Disease Control and Prevention. *United States, 2005*. 2005. <http://www.cdc.gov/dpdx/US-TB-2005>.
2. World Health Organization. *Global tuberculosis control: epidemiology, prevention, and control: the strategy to eliminate tuberculosis, including drug resistance*. Geneva: WHO, 2004.
3. Centers for Disease Control and Prevention. *United States, 2005*. 2005. <http://www.cdc.gov/dpdx/US-TB-2005>.
4. World Health Organization. *Global tuberculosis control: epidemiology, prevention, and control: the strategy to eliminate tuberculosis, including drug resistance*. Geneva: WHO, 2004.

XDR = Multidrug-resistant TB (MDR-TB) plus resistance to (i) any *fluoroquinolone*, and (ii) at least 1 of 3 injectable second-line drugs *capreomycin*, *kanamycin*, *amikacin* (new definition agreed October 2006)

MDR-TB = resistance to at least *isoniazid* and *rifampicin*, the two most powerful first-line anti-TB drugs

Of 17,690 isolates from 49 countries during 2000–2004, 20% were MDR-TB and 2% were XDR-TB

XDR-TB found in:
USA: 4% of MDR-TB
Latvia: 19% of MDR-TB
S Korea: 15% of MDR-TB

XDR-TB The Facts

- Drug-resistant TB poses a grave public health threat especially in populations with high HIV rates
- XDR-TB occurs as a result of poorly-managed TB control programmes
- XDR-TB, if identified early, can be treated and cured in some cases under proper TB control conditions, based on the experiences in a few successful programmes where HIV prevalence was low
- XDR-TB underlines the need for investment in the development of new TB diagnostics, treatments and vaccines, since the current tools are outdated and insufficient
- Infection control measures must be strengthened everywhere, and especially where HIV prevalence is high, to protect the vulnerable and those at risk of XDR-TB

Map of Mae Sot, Tak province



Mae Sot Workforce

- In 2004, over 124,500 migrants registered under the state's general registry in Tak Province – second only to Bangkok (203,488).
- It is estimated that the actual number of migrants living and working in Tak Province nearly 200,000.
- More than 200 factories in Mae Sot vary in size.

Health status of Burmese migrant workers in Mae Sot

- Most factories, however, allow migrants to hold their health card, even though migrants in Mae Sot generally prefer to go to Mae Tao Clinic (2006).
- Respiratory problems are also common, and it is known that some people suffer TB, which they can have treated at the hospital without charge.

Incidence of TB

- About 1.7 million people die from TB globally each year.
- Drug resistance is caused by poor TB control, through taking the wrong types of drugs for the incorrect duration. This is very worrying, especially mixed with HIV.

Incidence of TB in Mae Sot; Northern Thai-Burma Border Town

- TB remains one of the major diseases that the hundreds crossing from Burma and came in Mae Sot.
- Cynthia Maung reported approximately 700 cases of TB, of which 250 needed treatment.
- In 2002 Thai health officials started 885 Burmese to commence medical treatment for TB out of an estimated 30,000 migrant workers seeking jobs in the agriculture farms and garment factories.

XDR-TB in Thailand and in Mae Sot

- The review showed that 58,000 tuberculosis cases have been reported so far this year in Thailand.
- MOPH's studying the drug-resistant form of TB in 2001 and had found 13 cases identified as XDR-TB.
- Two patients who are Burmese migrant workers were confirmed with XDR-TB, a drug-resistant form, in the Mae Sot community along the border in June 2007.

Diagnosis of XDR-TB

- If TB bacteria are found in the sputum, TB can be diagnosed in a day or two, but this finding will not be able to distinguish between drug-susceptible and drug-resistant forms.
- To evaluate drug susceptibility, the bacteria need to be cultivated and tested in a suitable laboratory.
- Such a final diagnosis for TB, and especially XDR-TB, may take 6-16 weeks. To reduce this period, new tools for rapid TB diagnosis are urgently needed.

Treatment and Prevention Program on TB and XDR TB

- “Poor prescribing practices” in its analysis of the emerging problem of extensively drug-resistant (XDR) tuberculosis.
- XDR tuberculosis shows that those infected with the disease were never exposed to second-line drugs and most had never been treated for tuberculosis.
- Rather, afflicted patients were severely immune compromised as a result of HIV infection and were infected with XDR tuberculosis via primary transmission, perhaps in a nosocomial setting.

Therefore,

- To promote proper standards of tuberculosis care, those concerned about drug resistance should emphasize appropriate treatment for HIV.
- The separation of drug-resistant tuberculosis patients from susceptible individuals.

Interventions against XDR tuberculosis

- XDR tuberculosis patients are currently being treated with only two active agents as a result of poor medication access.
- This will undoubtedly amplify resistance, which may be averted by accelerating access to second-line agents for use in bolstered regimens.
- XDR tuberculosis needed careful examination from available data and current state of treatment efforts in the affected regions is required.

Global threat of XDR tuberculosis has great significance for the public health

- A reflection of weaknesses in tuberculosis management.
- Key to tuberculosis control
 - accurate diagnosis
 - proper curative treatment
 - supported and supervised
 - drugs are taken for the appropriate duration

Recipe for XDR tuberculosis

- inappropriate use of second-line drugs in a patient for whom first-line drugs are failing.
- Patients then spread the infection to close contacts.

Directly Observed Therapy (DOT)

- **ELEMENT 1:** Political commitment with increased and sustained financing
- **ELEMENT 2:** *Case detection through quality-assured bacteriology*
 - adoption of national standards in accordance with international guidelines;
 - decentralization of diagnostic services, with high proficiency levels maintained;
 - communication among members at various levels of the network; and
 - Functioning internal and external quality management, including supervision.

Directly Observed Therapy (DOT)

- **ELEMENT 3:** Standardized treatment, with supervision and patient support
 - **Treatment services**
 - **Supervision and patient support**
 - **Improving access to treatment**
- **ELEMENT 4:** An effective drug supply and management system

Directly Observed Therapy *(DOT)*

- **ELEMENT 5:** Monitoring and evaluation system, and impact measurement
 - **Recording and reporting system**
 - **Enhanced recording and reporting**

Vaccination prevents XDR-TB

- TB vaccine, called the bacille Calmette- Guérin (BCG) vaccine
- BCG would be expected to have the same effect in preventing severe forms of TB in children.
- Less effective in preventing TB in adults.
- New vaccines are urgently needed.

XDR-TB emergency milestone

WHO Global Task Force on XDR-TB, October 2006

- Accelerate access to rapid tests for *rifampicin* resistance for Burmese migrant workers.
- Initiate information-sharing strategies that promote prevention, treatment and control of XDR-TB through health center .
- Priority for the immediate strengthening of TB control in Thai-Burma Border.
- Accelerate implementation of infection control measures to reduce transmission.

XDR-TB emergency milestone

- Strengthen laboratory capacity to diagnose, manage and survey drug resistance. Commence rapid survey so that the size of the XDR-TB epidemic can be determined.
- Ensure adherence to WHO drug resistance guidelines, improve program management, access to MDR-TB drugs under proper conditions including direct observation.
- Ensure all patients with HIV are adequately treated for TB and started on antiretroviral therapy.

Conclusion

- TB patients are treated according to international standards of care
- Emergence of MDR-TB and XDR-TB is prevented by ensuring that TB patients are cured the first time around
- Prevention, however, is insufficient . It is needed immediate detection through rapid drug-susceptibility testing
- treatment requires access to second-line drugs

Conclusion

- HIV control
 - All available public health measures must be implemented when these diseases converge, starting with DOTS, the essential package of tuberculosis-control intervention based on diagnosis and treatment of infectious cases, and HIV–AIDS prevention and treatment.
- Surveillance systems

Stop TB Strategy among Burmese migrants

- High-quality DOTS programs
- Addressing HIV-associated tuberculosis
- Drug resistance
- Strengthening health care systems
- Strengthening primary care services
- Encouraging all providers to follow good practices
- Empowering patients and communities to improve health
- Enabling and promoting research