Committee on Oversight and Government Reform, Chairman Henry A. Waxman

HIV/AIDS Today

Vol. 1, Issue 22: June 20, 2008

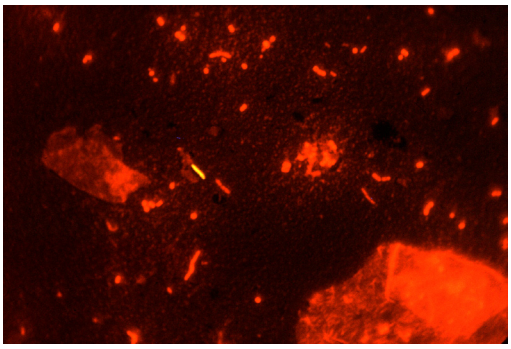
Tuberculosis and HIV

Tuberculosis is the second greatest infectious disease killer of youth and adults in the world, killing nearly 5,000 people a day. This week's HIV/AIDS Today examines the transmission, prevention, and treatment of tuberculosis and discusses the relationship between TB and HIV.

INFECTION VS. DISEASE

One in three people in the world is infected with Mycobacterium tuberculosis, the bacteria that cause TB. TB bacteria are spread through the air when a person with TB disease of the lungs or throat coughs, sneezes, or laughs. TB is not spread by sharing a cup, kissing, or otherwise exchanging saliva with someone with TB disease.[i]

People with latent TB infection are not ill and cannot transmit the disease. If the bacteria become active, due to reduced immunity that can be caused by malnutrition, advancing age, or HIV, an infected person usually develops one or more symptoms of TB contagious disease.[ii]



Mycobacterium tuberculosis in sputum smear stained using fluorescent acid-fast stain. source http://phil.cdc.gov/

TB primarily affects the lungs, causing a bad cough, pain in the chest and coughing up blood. Extrapulmonary TB affects the brain, kidneys, and other organs. TB disease can cause serious health problems, including death, if untreated.[iii]

MDR-TB AND XDR-TB

Multidrug-resistant TB (MDR-TB) develops when TB bacteria become resistant to at least two of the most powerful first-line TB treatment drugs. Resistance develops as a result of misuse or mismanagement of the first-line treatment. If subsequent second-line TB treatment is misused or mismanaged, TB can become extensively drug-resistant TB (XDR-TB). The TB bacteria is then resistant to first and second-line anti-TB drugs, severely limiting treatment options for sick patients.[iv]

Once resistant, the MDR-TB or XDR-TB bacteria can be spread from person to person in resistant form.[v]

Accurate diagnosis of MDR-TB and XDR-TB is limited, because laboratory capacity is weak and the technology to detect resistance is mostly unavailable in developing countries. However, in 2006, 489,139 new MDR-TB cases were reported, the highest number to date. Forty-five countries have reported one or more cases of XDR-TB. Across the 35 countries able to report specific data on XDR-TB, 7.5% of MDR-TB cases tested were found to be XDR-TB.[vi]

TUBERCULOSIS AND HIV/AIDS

An estimated one-third of people living with HIV worldwide are co-infected with TB, the majority living in sub-Saharan Africa. In Botswana, Kenya, Malawi and Swaziland, more than half of people newly infected with TB are also HIV-infected. Up to half of all AIDS patients in the world die of TB.[vii]

HIV accelerates the progression of latent TB to TB disease. Without appropriate treatment a person with HIV and active TB can die within several weeks. Further, TB is harder to diagnose in a person living with HIV.[viii]

PREVENTION, DIAGNOSIS AND TREATMENT

Preventive Therapy

Isoniazid preventive therapy (IPT) is a drug treatment used to prevent latent TB from progressing to active disease. Since 1998, the WHO has recommended IPT as a key prevention intervention to reduce the burden of TB in people living with HIV. However, adoption and implementation of IPT as part of a package of TB

services has been low.[ix]

Vaccine Research

The BCG vaccine, first used in 1921, prevents severe forms of TB in children but is less effective in preventing pulmonary TB in adults. Several organizations trying to develop a TB vaccine have vaccine candidates in the development stage. However, even if one of these candidates proves successful, it will probably not be licensed for use until at least 2015.[x]

Diagnosis and Diagnostics

The only widely available tool for diagnosing TB in most developing countries is the more than 100-year -old method of microscopic examination of sputum. If TB bacteria are identified in the sputum smear, a TB diagnosis is possible within one or two days of the sample collection.

Further laboratory testing to determine if TB is a resistant strain typically takes anywhere from six to sixteen weeks.[xi] A recently developed diagnostic test takes only one to two days to detect resistance to the two most common first-line treatment drugs. However, this test and others under evaluation are expensive and implementation in developing countries will take additional investment.[xii]

Additional challenges exist in detecting TB within a person living with HIV since TB within those who are HIV positive is not typically detectable on a sputum smear. Extrapulmonary TB in those with HIV and others is generally more difficult to diagnose since it often requires invasive procedures to obtain specimens and more advanced laboratory techniques.[xiii]

DOTS

"Directly observed treatment, short-course," or DOTS, is the most widely endorsed care and treatment strategy for those with TB. The DOTS strategy requires sustained government financing, accurate diagnosis, patient support (sometimes including direct observation of treatment adherence), a regular supply of quality anti-TB drugs, and a recording and reporting system to capture TB data.[xiv]

ENDNOTES

[i] The Centers for Disease Control. *Tuberculosis: The Connection Between TB and HIV (the AIDS virus)* (accessed June 19, 2008) (online at http://www.cdc.gov/TB/pubs/pamphlets/TB-HIVEng.PDF).

[ii] World Health Organization. *Frequently Asked Questions—XDR-TB* (Oct. 17, 2006) (online at http://www.who.int/tb/challenges/xdr/faqs/en/print.html).

[iii] *Supra* note i; AVERT. *Tuberculosis* (accessed June 19, 2008) (online at http://www.avert.org/tuberculosis.htm).

[iv] *Supra* note ii.

[v] World Health Organization. *Tuberculosis XDR-TB The Facts* (Nov. 2007) (online at http://www.who.int/tb/challenges/xdr/facts_nov2007_en.pdf).

[vi] The WHO/IUATLD Global Project on Anti-Tuberculosis Drug Resistance Surveillance. *Anti-Tuberculosis Drug Resistance In the World, Report No. 4*. (2008) (online at http://www.who.int/tb/publications/2008/drs_report4_26feb08.pdf).

[vii] World Health Organization. *TB/HIV* (accessed June 19, 2008) (online at http://www.who.int/tb/challenges/hiv/qa.pdf); World Health Organization. Global Tuberculosis Control (2000) (online at http://whqlibdoc.who.int/hq/2000/WHO_CDS_TB_2000.275.pdf).

[viii] Stop TB Partnership. *Fight Aids Fight TB Fight Now* (accessed June 19, 2008) (online at http://www.stoptb.org/news/archives/iacxv/assets/InfoPack/InfoPackEnglish.pdf).

[ix] Low uptake has been in part due to a view that IPT can create drug resistance to isoniazid, even though no evidence exists to substantiate this view. Stop TB Partnership Global TB/HIV Working Group. *Isoniazid Preventive Therapy (IPT) for People Living with HIV* (accessed June 19, 2008) (online at http://www.stoptb.org/wg/tb_hiv/assets/documents/IPT%20Consensus%20Statement%20TB%20HIV%20Core%20Group.pdf).

[x] *Supra* note ii; World Health Organization. *Issues Relating to the Use of BCG in Immunization Programmes* (1999) (online at http://www.who.int/vaccines-documents/DocsPDF99/www9943.pdf).

[xi] Stop TB New Diagnostics Working Group. *Strategic Plan 2006-2015* (accessed June 19, 2008) (online at http://www.stoptb.org/wg/new_diagnostics/assets/documents/SP%20Stop%20TB%20Dia%20WG%20-FINAL-Dec2005.pdf).

[xii] Stop TB Partnership. *TB Diagnostics Pipeline* (Nov. 2007) (online at http://www.stoptb.org/retooling/assets/documents/TB%20DIAGNOSTICS%20PIPELINE%20March08.pdf).

[xiii] World Health Organzation. *TB Epidemiology and Surveillance Workshop* (accessed June 19, 2008) (online at http://www.who.int/tb/surveillanceworkshop/trend_analysis/increasing_decreasing_over_under_diagnosis_of_extrapulmonary_tb.htm).

[xiv] World Health Organization. *Pursue High-Quality DOTS Expansion and Enhancement* (accessed June 19, 2008) (online at http://www.who.int/tb/dots/en/).