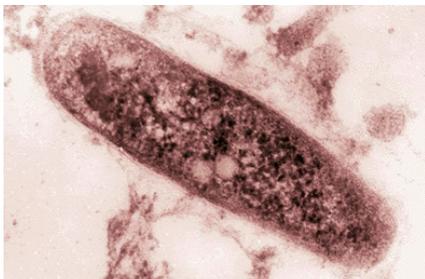


Tuberculosis – Adaptability through the centuries



Thin section transmission electron micrograph of *Mycobacterium tuberculosis*. Source: New York State, Wadsworth Center, NY Department of Health - www.wadsworth.org.

Tuberculosis is a social disease, and presents problems that transcend the conventional medical approach. On the one hand, its understanding demands that the impact of social and economic factors on the individual be considered as much as the mechanisms by which tubercle bacilli cause damage to the human body. On the other hand, the disease modifies in a peculiar manner the emotional and intellectual climate of the societies that it attacks.

- Rene and Jean Dubos, *The White Plague: Tuberculosis, Man, and Society*, 1952

creature”ⁱ has plagued man since the beginning of human existence. *Mycobacterium tuberculosis* (TB) is described in historical writings of Hippocrates, Aristotle and others. Evidence of its existence has been found in the spines of Egyptian mummies 5,400 years old. In December 2007, evidence of meningeal tuberculosis was discovered in skull fragments of a 500,000 year old *Homo erectus*!

Only 10-15% of persons infected with *M. tuberculosis* go on to develop overt illness. Those who develop active TB do so over years and decades. This ensures that diverse populations, staggered in time, are exposed and newly infected.ⁱⁱ Hence, the “minute creature” has survived through the eons of time.

Until the 1940’s when Para-aminosalicylate, Streptomycin and Isoniazid were discovered to be effective static and cidal agents, the only treatment available was rest, a nutritious diet, fresh air, and sunshine. The last new TB drug introduced was Rifampicin in 1967.

Multiple drug trials are underway, but will be, at best, several years before any of these drugs are available.

This clever “minute creature” has once again outwitted man’s attempts at eradication, first with the emergence of **MDR** (multi-drug resistant) TB and now **XDR** (extensively drug

This “wonderfully minute living

resistant) TB. This emergence threatens to send TB control efforts back to pre-antibiotic times and jeopardizes the delicate balance between individual and societal rights.

MDR TB – *M. tuberculosis* strains resistant to at least isoniazid and rifampin, two of the most effective first line drugs.

XDR TB – *M. tuberculosis* strains resistant to Isoniazid and rifampin (MDR TB) plus resistant to any fluoroquinolone and at least one of three injectable second-line drugs (i.e., amikacin, kanamycin, or capreomycin).ⁱⁱⁱ

The United States is a fortunate country with low rates of all forms of TB. But, peoples of the world are mobile and TB, as well as other infectious diseases, is only an aircraft flight away. (Recall earlier 2007, the person with MDR TB who did not wish to cancel his overseas wedding plans).

Americans hold individual freedoms and personal honor in high esteem. This is one of the reasons isolation and quarantine laws are intentionally vague. The majority of persons with active TB voluntarily comply with recommended treatment, including isolation until infectiousness has resolved, without the need to involve legal authorities. It is extremely rare that Federal isolation/quarantine authority is required to manage domestic TB cases.^{iv} It is somewhat discouraging news however, that from June 2006 to June 2007, CDC has investigated nearly 100 incidents of air travelers with infectious TB.^v

In July 2007 the CDC issued a statement: **“Protecting the Public’s Health against Tuberculosis: Moving Forward”**. His statement outlines action needed to meet the challenges ahead to maintain control and prevention of tuberculosis in the United States:

First, it is critical that we ensure that the public understand the basic facts about how this disease evolves, how it is transmitted, and how to protect their own health and that of others. Like many infectious diseases, tuberculosis takes weeks to months to identify or diagnose, is challenging to treat, and can sometimes be spread by people who don't appear to be ill. The challenging nature of TB also means that effectively treating it and preventing its transmission, requires a sustained partnership between health care providers, local and state public health practitioners, and patients infected with the disease.

*Second, it is worth reiterating that anyone with active TB disease, regardless of whether it is drug-resistant, **should avoid situations that place them in prolonged contact with others, including flying on commercial aircraft.** TB is generally not spread by casual contact, but typically requires relatively prolonged contact in shared airspace. The environment on long flights in commercial aircraft, particularly those of eight or more hours in length, has been previously implicated in TB transmission, especially to passengers seated in close proximity. This is the basis for the World Health Organization (WHO) guidelines for the prevention of TB transmission during air travel. Protecting the health of international air travelers requires building and sustaining partnerships between public health and infected individuals.*

*Third, in moving forward, we need to increase our efforts to communicate strongly and clearly about risks posed by tuberculosis; strengthen our efforts to reduce the fear and stigma associated with this devastating disease; and clarify and reinforce the roles that patients, clinicians, and public health officials play in infectious disease control. There's no doubt we have had considerable success in TB prevention and control in the United States. **There's also no doubt the increasing prevalence of drug-resistant tuberculosis bacteria across the world is a reminder that much more needs to be done.** ...Effective public health response to MDR and XDR TB requires accelerated efforts and*

earnest engagement by multiple sectors of society. All of us—patients, providers, health officials, and policymakers—share a responsibility to take action now to prevent further transmission.^{vi}

Washoe County Tuberculosis Prevention and Control Program has treated 7 cases of tuberculosis resistant to one (mono-drug resistance) or more drugs (poly drug resistance – resistance to more than one drug other than isoniazid and rifampin) in the past 5 years. **To date there have been no reported cases of multi-drug resistant or extensively drug resistant TB in Washoe County.**

Health care providers in Washoe County are required to report active TB (suspect or confirmed) to the Washoe County District Health Department. **To report by fax, send reports to (775) 328-3764. To report by phone, or to contact us with questions regarding TB, please call (775) 328-4785.** The TB Prevention and Control Program staff would like to express their gratitude to the community providers and laboratories who report suspected and/or confirmed tuberculosis cases.



REFERENCES

ⁱ Marten, Benjamin; A New Theory of Consumptions: More Especially of a Phthisis or Consumption of the Lungs. 1720.

ⁱⁱ Iseman, Michael D; A Clinician's Guide to Tuberculosis, 2000, page 2.

ⁱⁱⁱ CDC MMWR Notice to Readers: Revised Definition of Extensively Drug-Resistant Tuberculosis, November 3, 2006/55(43); 1176.

^{iv} Department of Health and Human Services; Testimony Before the Committee of Homeland Security; United States House of Representatives Recent Case of Extensively Drug Resistant TB: CDC's Public Health Response; statement of Julie L. Gerberding, MD, MPH, Director of CDC/DHHS

^v USA Today "Fliers Sought After Tuberculosis Scare" USA Today (12.31.07):Steve Sternberg

^{vi} CDC "Protecting the Public's Health Against Tuberculosis: Moving Forward" Martin S Cetron, MD Captain, U.S. Public Health Service Director, Global Migration and Quarantine, Centers for Disease Control and Prevention. Kenneth G. Castro, M.D. Assistant Surgeon General, U.S. Public Health Service Director, Tuberculosis Elimination Centers for Disease Control and Prevention. 07/26/2007