Mississippi State Department of Health

Mississippi Morbidity Report

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Tuberculosis in Mississippi

- TB remains a persistent threat to the health and welfare of Mississippians.
- Advances in TB diagnostics and treatment will aid Mississippi's efforts against TB.
- TB in Mississippi is primarily among U.S. born individuals with the highest risk among those > 65 years of age.
- Report and isolate TB disease suspects at first knowledge or suspicion of disease.

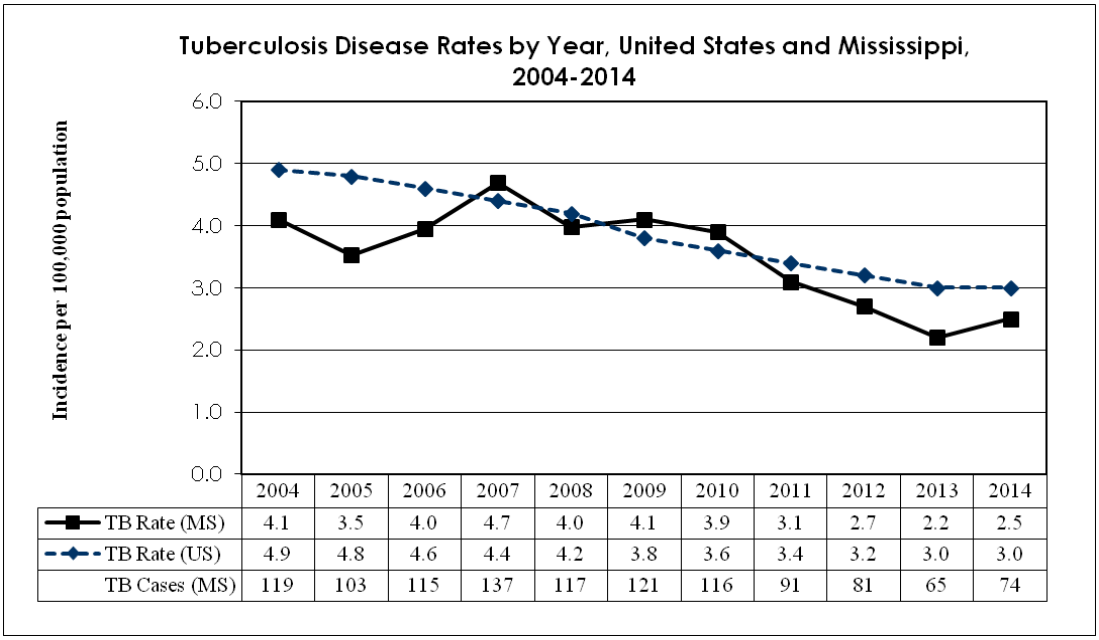
Tuberculosis (TB) Basics

Tuberculosis in humans can be segmented into two separate conditions: **TB infection (TBI) and TB disease**. TBI is a condition that results from exposure to an infectious case, leading to chronic infection with viable TB germs without clinical illness. Patients with TBI are not contagious but may develop clinical disease at a later date. TB disease is a clinical condition resulting from active TB replication and tissue destruction, most commonly in the lung but any organ system may be affected. Patients with TB disease of the lung are considered contagious prior to treatment.

Epidemiological Trends in the U.S.

The rate of TB disease in the U.S. has been gradually declining since 1993; but the U.S. remains far from its goal of TB elimination (< 1 case per 1,000,000 population) and data suggests that progress toward this goal is slowing. In 2014 there were 9,412 cases of TB disease reported, down from 9,567 in 2013, representing a 2.2% decline. Foreign born individuals experienced a TB case rate thirteen times higher than the U.S. born population, accounting for 66.5% of the total burden of disease. Ethnic and racial minorities are also at higher risk of developing TB disease, with case rates eight times higher for African Americans, eight times higher for Hispanics and 29 times higher for Asians. Multidrug resistant strains of TB accounted for 1.3% of cases.

Figure



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
TB Rate (MS)	4.1	3.5	4.0	4.7	4.0	4.1	3.9	3.1	2.7	2.2	2.5
TB Rate (US)	4.9	4.8	4.6	4.4	4.2	3.8	3.6	3.4	3.2	3.0	3.0
TB Cases (MS)	119	103	115	137	117	121	116	91	81	65	74

Epidemiological Trends in Mississippi

In 2014, Mississippi experienced a 13% increase in the TB disease case rate, but still remained below the national average (Figure). Unlike the rest of the country, the vast majority of TB disease cases in Mississippi occur in individuals born in the U.S., accounting for 83% of total. TB disease rates among African Americans are higher than whites in MS (3.9 vs. 1.5 per 100,000), but are much lower than the AA disease rate for the U.S. as a whole. The Mississippi State Department of Health (MSDH), using advanced molecular characterization of all TB isolates, can identify cases due to recent transmission and outbreaks. Based on genotypic analysis, 31% of TB disease cases were due to recent transmission and 69% were due to remote exposures. Persons > 65 years of age are accounting for an increasing proportion of TB disease cases in MS (32% in 2013 and 42% in 2014), presumably due to exposures occurring years ago when TB transmission was more common and prior to implementation of directly observed treatment for TB disease. Following TB infection the cumulative lifetime risk of developing TB disease is approximately 10%, with 50% of TB cases occurring within the first two years after exposure and infection. Based on the high risk of active disease in the first two years after infection, the health department actively finds and tests all close contacts of TB cases. Following infection, TB germs can lie dormant but viable throughout an individual's lifetime, putting him or her at risk of TB disease. An estimated 90,000 Mississippians are thought to have TBI, capable of causing disease at a future date. Preventive therapy can decrease that risk by 70-90%.

Advances in TB Diagnosis and Treatment in Mississippi

Interferon Gamma Release Assays

To identify asymptomatic infection (TBI), two separate modalities are available: the Tuberculin Skin Test (TST), and the Interferon Gamma Release Assays (IGRAs), Quantiferon –TB Gold In-Tube® and T-Spot TB®. IGRAs are serum based assays that detect interferon-gamma production following stimulation with specific TB antigens. IGRAs have the benefit of not resulting positive due to prior use of the BCG vaccine and are less likely to be falsely positive due to prior exposures to non-tuberculous mycobacteria, such as *Mycobacterium avium*. Since 2008, MSDH has adopted the IGRA assay Quantiferon Gold In-Tube® for routine use. TST's remain available as an alternative for the community at all county health departments, but for purposes of TB control, MSDH uses IGRAs almost exclusively as the preferred test. Quantiferon testing can be obtained through any county health department statewide, with analysis performed at the Mississippi Public Health Lab. It is important to remember that both TST and IGRAs are insensitive for the diagnosis of TB disease, yielding false-negative results in approximately 25% of cases.

Treatment of TBI and a Novel 12 Week Regimen: 3HP

Treatment is recommended for asymptomatic TB infection (TBI) to eradicate organisms and to prevent the progression to TB disease. There are three separate regimens recommended by the Centers for Disease Control and Prevention (CDC) for the treatment of TBI (http://www.cdc.gov/tb/topic/treatment/ltbi.htm): isoniazid for 9 months (daily or directly observed biweekly), rifampin daily for 4 months, or ***directly observed once weekly*** isoniazid and rifapentine (a long acting rifampin analog) for 12 weeks (a regimen referred to as 3HP). 3HP was approved as a recommended regimen in 2011, following study results comparing 3HP with 9 months of isoniazid that showed superior completion rates (82% vs. 69%) and non-inferiority in the prevention of subsequent TB disease. Adverse effects necessitating discontinuation were slightly higher in the 3HP group (4.9% vs. 3.7%), but hepatotoxicity was more common in the isoniazid group compared to 3HP (2.0% vs. 0.3% respectively)[1].

TBI, including any positive TST or IGRA, is a Class 2 Reportable condition, necessitating notification of MSDH within 1 week. Prior to initiating treatment for TBI, a thorough investigation must be performed to rule out TB disease. 3HP should only be administered through MSDH or with close consultation with MSDH, and must only be administered as ***Directly Observed Therapy*** (DOT). 3HP is

not recommended for children aged <2 years, HIV-infected patients receiving antiretroviral treatment, pregnant women or women expecting to become pregnant during treatment, and 3HP should be used cautiously in patients with other medical conditions. Close review of drug interactions should be completed prior to initiating any TBI treatment regimen. Since 2011, 1248 individuals have successfully completed 3HP in MS, with an overall completion rate of 82%.

Nucleic Acid Amplification for the Detection of TB

Culture techniques for *M. tuberculosis* can require 2 – 6 weeks to positively identify organisms. Nucleic Acid Amplification (NAA) testing for TB DNA has the advantage of rapidly detecting TB bacteria. Since August 2013, FDA has permitted the marketing of Cepheid's Xpert MTB/RIF® assay. This test can not only rapidly determine the presence of TB organisms; it can also detect the presence of rifampin resistance, a marker frequently associated with Multi-Drug Resistant TB. MSDH has been using the Cepheid Xpert MTB/RIF® assay for the rapid identification of TB since 2011.

For acid fast smear (AFB) positive respiratory specimens, Xpert MTB/RIF has a sensitivity of 99.7% and a specificity of 98.5% for the detection of TB disease when compared to culture. For smear negative specimens from culture confirmed cases, sensitivity is diminished to 76.1% with a specificity of 98.8%. MSDH performs this DNA test on all new smear positive respiratory specimens and requested smear negative respiratory specimens for clinical TB suspects. A negative Xpert MTB/RIF result from a smear positive specimen is a strong indicator for the presence of a non-tuberculous mycobacterial organism. Respiratory specimen cultures are still necessary to confirm the diagnosis of TB disease and to identify any drug resistance. Due to the capacity of this test to identify individuals with TB disease, two negative Xpert MTB/RIF results is now considered equivalent to three negative sputum smears for the determination of whether or not to maintain a patient on airborne isolation[2]. If a patient is considered a suspect, even with negative smears and Xpert MTB/RIF testing, isolation should be maintained until at least two weeks of appropriate TB treatment is completed or in consultation with the health department.

What Mississippi Providers Can Do: Think TB

Although generally TB disease rates have been declining, the increase in Mississippi in 2014 reminds all clinicians to consider TB, particularly in the setting of active lung disease. Several recent TB disease cases in MS have been identified weeks or months after initial presentation. These cases were initially diagnosed as community acquired pneumonia (CAP) and resulted in numerous preventable TB exposures. In settings where TB or CAP is a likely diagnosis, it is important to avoid the use of fluoroquinolones (FQs). FQs are active TB drugs and may mask or delay a TB diagnosis or lead to resistance. Active TB disease is a Class 1 Reportable Condition, requiring immediate health department notification on first knowledge or suspicion. To report a confirmed or suspected TB case, please call 601 576-7700 (or 601 576-7400 after hours).

References:

1. Sterling TR,Villarino ME, Borisov AS, et al. (2011). Three Months of Rifapentine and Isoniazid for Latent Tuberculosis Infection. N Engl J Med, 365, 2155–66.
2. Revised Device Labeling for the Cepheid Xpert MTB/RIF Assay for Detecting *Mycobacterium tuberculosis* (2015, February 27). MMWR: Morbidity and Mortality Weekly Report, 64(07), 193.

Mississippi
Provisional Reportable Disease Statistics

February 2015

		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Feb 2015	Feb 2014	YTD 2015	YTD 2014
Sexually Transmitted Diseases	**Primary & Secondary Syphilis**	-	-	-	-	-	-	-	-	-	†	†	†	†
	Early Latent Syphilis	-	-	-	-	-	-	-	-	-	†	†	†	†
	Gonorrhea	-	-	-	-	-	-	-	-	-	†	†	†	†
	Chlamydia	-	-	-	-	-	-	-	-	-	†	†	†	†
	HIV Disease	-	-	-	-	-	-	-	-	-	†	†	†	†
Myco-bacterial Diseases	**Pulmonary Tuberculosis (TB)**	0	0	2	0	2	0	1	0	0	**5**	6	9	9
	Extrapulmonary TB	0	0	0	0	0	1	0	0	0	**1**	0	2	2
	Mycobacteria Other Than TB	3	3	4	1	7	3	3	3	1	**28**	49	65	82
Vaccine Preventable Diseases	**Diphtheria**	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Pertussis	0	0	0	0	0	0	0	0	0	**0**	2	0	10
	Tetanus	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Poliomyelitis	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Measles	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Mumps	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Hepatitis B (acute)	0	0	0	0	0	0	0	1	1	**2**	0	6	4
	Invasive *H. influenzae* disease	1	1	0	0	1	0	0	0	0	**3**	3	8	3
	Invasive Meningococcal disease	0	0	0	0	0	0	0	0	0	**0**	0	0	0
Enteric Diseases	**Hepatitis A (acute)**	0	0	0	0	0	0	0	0	0	**0**	0	0	1
	Salmonellosis	1	1	1	1	6	0	1	0	1	**12**	24	49	61
	Shigellosis	0	0	0	1	3	0	0	0	0	**4**	10	11	27
	Campylobacteriosis	0	2	0	0	2	0	1	2	1	**9**	3	17	9
	***E. coli* O157:H7/STEC/HUS**	0	1	0	0	0	0	0	0	0	**1**	2	1	3
Zoonotic Diseases	**Animal Rabies (bats)**	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Lyme disease	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Rocky Mountain spotted fever	0	0	0	0	0	0	0	0	0	**0**	0	0	2
	West Nile virus	0	0	0	0	0	0	0	0	0	**0**	0	0	0

*Totals include reports from Department of Corrections and those not reported from a specific District.

†Data not available.