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Meningitis in Mississippi

Public health action is taken when either *Neisseria meningitidis or Haemophilus influenzae* b is reported as a cause of invasive disease (usually meningitis) in a Mississippi resident. There are, however, other causes of meningitis, and all are reportable, as reports can help identify clusters of cases, and define trends to better alert health care providers around the state.

Etiology:

Viruses are the predominant cause of "aseptic" meningitis. Enteroviruses, such as Coxsackie virus A and B, and echovirus are the most commonly identified causes of viral meningitis. Infection with these viruses usually results in no or very mild upper respiratory or flu-like symptoms, but sometimes invasion into the CSF occurs with resultant meningitis. Signs and symptoms include headache, fever and stiff neck, and sometimes a rash. Abnormal laboratory tests generally include CSF pleocytosis (usually mononuclear, sometimes neutrophilic in the early stages), with normal glucose, possible mildly elevated protein, and absence of bacteria. Transmission is usually through the fecal-oral route or direct contact with oral and nasal secretions of an infected person, and the highest incidence is in the summer and fall. Viral meningitis is relatively common, less likely to cause severe disease than bacterial meningitis, and individual cases usually require no immediate public health response. Infants and young children, who have not yet acquired immunity to these viruses, are most at risk for viral meningitis. Enteroviral meningitis can occur in clusters that may relate to a common source exposure.

Arboviruses, including West Nile and La Crosse viruses, St. Louis, and Eastern equine encephalitis viruses can cause meningitis as well as encephalitis. This type meningitis is also more common in the summer and early fall, when mosquitoes are more prevalent.

Many bacteria can cause meningitis; the most commonly reported in Mississippi in 2007 were *Neisseria meningitidis* and *Streptococcus pneumoniae* (Table). In the past, *Haemophilus influenzae* b was the most common cause of childhood meningitis and the leading cause of acquired mental retardation, but the use of an effective vaccine has nearly eliminated invasive disease due to this bacteria.

Neisseria meningitidis:

N. meningitidis is a gram negative aerobic dipplococcus which can be divided into serogroups, the most common of which are A, B, C, Y and W135. These bacteria can cause meningitis with sepsis, or either manifestation alone. Illness can include headache, fever, stiff neck, and a rash which can be petechial (usually on the trunk and/or lower extremities, often where clothes put pressure on the skin) or transient and maculopapular. The case fatality rate, even with the use of antibiotics, is 8 to 15% in the U.S. Sequelae, including hearing loss, mental retardation and loss of limb use occur in 10 to 20% of survivors. At any given time, 5 to 10% of the population are asymptomatic carriers of *N. meningitidis*. Transmission is through direct contact with nose and throat secretions of infected individuals or carriers, and usually results in subclinical mucosal infection. Chronic carriers are less likely to develop invasive disease than those who are newly infected. The incubation period is 2 to 10 days (usually 3 to 4), and the patient remains contagious until 24 hours after antibiotic treatment has started.

In Mississippi, 7 to 30 cases are reported annually (Table). MSDH investigates each reported case and provides prophylactic antibiotics (rifampin) for household and other appropriate close contacts. Health care workers are not usually at risk even when caring for infected patients and only direct contact with nasopharyngeal secretions (such as mouth to mouth resuscitation) warrants prophylaxis.

Vaccine: A quadrivalent meningococcal conjugate vaccine (MCV4) is available and approved for individuals 2 through 55 years. The Advisory Committee for Immunization Practices (ACIP) recommends the vaccine be given to children 2 through 10 years who are at increased risk of disease, including those traveling to countries where meningococcal disease is endemic or hyperendemic, those with terminal complement component deficiencies, and those children who have anatomic or functional asplenia. HIV infected children are also at increased risk for meningococcal disease, although the efficacy of the vaccine in this population is not known. **ACIP recently recommended that all children 11 – 18 years be given one dose of MCV4 at the earliest opportunity, and that it be included routinely in the 11 -12 year physician visit.** The recommendation that anyone aged 19 – 55 at higher risk be vaccinated remains in place. This group includes college freshmen living in dormitories, microbiologists routinely exposed to isolates of *N. meningitidis*, military recruits, travelers to or residents of countries in which *N. meningitidis* meningitis is hyperendemic or epidemic, persons with terminal complement component deficiencies and those with functional or anatomic asplenia. Persons with a history of Guillain-Barré syndrome (GBS) might be at increased risk for postvaccination GBS; therefore, a history of GBS is a relative contraindication to receiving MCV4. The alternative is to give the older meningococcal polysaccharide vaccine (MPSV4) for short term prevention (3 to 5 years).

Haemophilus influenzae b (Hib):

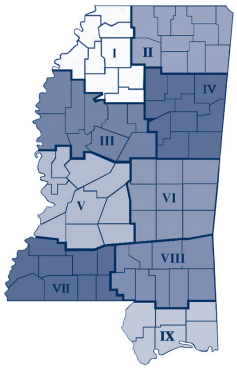
H. influenzae is a gram negative, aerobic coccobacillus that can be either unencapsulated (nontypeable) or encapsulated. The encapsulated bacteria are divided into serotypes a through f, serotype b being the most pathogenic. Until the late 1980's and the widespread use of Hib vaccine in children, Hib was the leading cause of meningitis in children in the U.S. The peak incidence was in children 6 to 12 months of age, where currently this disease rare. Meningitis is the most severe form of invasive disease, but Hib can also cause sepsis, septic arthritis, epiglottitis, pneumonia, and cellulitis. Meningitis onset is usually acute, but may be preceded by upper respiratory symptoms. Signs and symptoms include headache, fever, vomiting, stiff neck, or in infants, a bulging fontanelle. Twenty to 30% of survivors had some sequelae, ranging from mild hearing loss to mental retardation. Before the widespread use of Hib vaccine, 2 to 4% of children carried the bacteria in their nasopharynx. The rate of carriage among vaccinated children has decreased to less than 1%. Transmission is through oropharyngeal contact with respiratory secretions of an infected person. The incubation period is 3 to 4 days, and the patient is contagious until 24 to 48 hours after antibiotics are started. In Mississippi, prior to the use of the Hib vaccine in young children, 80 to 100 cases were reported in the state annually. Currently, Hib in infants is rarely reported (Table). Each reported case is investigated, and appropriate family and close contacts are provided rifampin prophylaxis, if there are children less than one year of age in the household or children 1 to 3 years old who are inadequately vaccinated.

Vaccine: Three Hib conjugate vaccines are licensed for use in children. Two are licensed for children less than a year of age. It is currently recommended that all infants be vaccinated using a schedule that includes 2 or 3 doses (depending on the formulation) beginning at 2 months of age. A booster dose is recommended at 12 to 15 months of age.

In December of 2007, Merck & Co., Inc. (West Point, Pennsylvania) voluntarily recalled several lots of its Hib containing vaccine (PedvaxHIB®, and Comvax®- a Hib/hepatitis B vaccine), resulting in a supply chain problem that may result in a shortage. To assure the availability of vaccine for the youngest infants, MSDH is following CDC, ACIP and AAP recommendations that the booster dose be deferred in all but the highest risk children, including children with asplenia, sickle cell disease, HIV infection and certain other immunodeficiency syndromes, malignant neoplasms, and children who are American Indians or Alaskan natives. Health care providers are asked to keep track of children for whom the booster dose is deferred to facilitate recalling them for vaccination when supply improves.

References on request

Reported by: Mary Currier, MD, MPH, State Epidemiologist



Mississippi
Provisional Reportable Disease Statistics

December 2007

		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Dec 2007	Dec 2006	YTD 2007	YTD 2006
Sexually Transmitted Diseases	**Primary & Secondary Syphilis**	1	0	1	0	7	0	0	2	2	13	18	118	87
	Total Early Syphilis	5	2	5	0	13	1	2	5	5	38	55	392	284
	Gonorrhea	15	14	33	36	69	33	8	34	26	268	561	7892	7510
	Chlamydia	92	42	92	70	184	47	25	75	37	664	1381	20467	19001
	HIV Disease	5	4	3	2	20	5	6	5	4	54	40	646	599
Myco-bacterial Diseases	**Pulmonary Tuberculosis (TB)**	0	1	2	1	4	2	1	2	0	13	17	117	105
	Extrapulmonary TB	0	0	0	0	1	0	0	0	1	2	2	13	10
	Mycobacteria Other Than TB	3	3	0	0	5	1	2	5	3	22	37	246	244
Vaccine Preventable Diseases	**Diphtheria**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pertussis	0	0	1	0	0	3	0	0	0	4	1	250	37
	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	2	2
Viral Hepatitis	**Hepatitis A**	0	0	0	0	0	0	0	0	0	0	0	8	9
	Hepatitis B (acute)	0	0	0	0	0	0	0	0	0	0	0	35	13
	Hepatitis C (acute)	0	0	0	0	0	0	0	0	0	0	0	4	4
Enteric Diseases	**Salmonellosis**	3	2	1	1	5	3	3	2	4	24	29	1027	788
	Shigellosis	0	1	5	0	63	8	20	6	10	113	32	1400	133
	Campylobacter Disease	0	0	1	0	4	0	0	1	0	6	4	125	79
	E. coli O157:H7/HUS	0	0	0	0	1	0	0	0	0	1	0	8	11
Other Conditions of Public Health Significance	**Invasive Meningococcal Disease**	1	0	0	0	0	0	0	0	0	1	2	12	7
	Invasive *H. influenzae* b Disease	0	0	0	0	1	0	0	0	0	1	0	10	13
	RMSF	0	0	0	0	0	0	0	0	0	0	0	14	10
	West Nile Virus	0	0	0	0	0	0	0	0	0	0	1	129	184
	Lyme Disease	0	0	0	0	0	0	0	0	0	0	0	1	3
	Animal Rabies (bats)	0	0	0	0	0	0	0	0	0	0	0	1	4

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

Table: Reported Cases of Meningitis in Mississippi by Cause and Year										
Causative Agent	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Aseptic	116	40	49	114	51	89	100	79	47	36
Cryptococcus	6	16	9	17	22	30	24	31	24	17
*N. meningitidis**	30	24	15	18	20	24	20	7	7	13
S. pneumoniae	10	13	16	16	8	16	10	13	15	10
Group B *Streptococcus*	7	3	6	4	1	2	8	6	5	4
S. aureus	0	0	0	0	0	1	0	5	3	5
H. influenzae b*	0	2	0	0	0	1	0	0	4	0
Other/unknown bacteria	14	12	37	41	51	96	95	73	69	83
Total	183	110	132	210	153	259	257	214	174	168

*Includes sepsis as well as meningitis