



Mississippi Morbidity Report

Memorable Vaccine Preventable Diseases

Introduction: At the beginning of the 20th century, infectious diseases were widely prevalent and accounted for 5 of the top 10 causes of death. In 1900, over 21,000 cases of smallpox were reported, with 894 deaths. In 1920, more than 469,000 cases of measles were reported and 7,575 of these died. Early in the 20th century, in the US, tuberculosis, pneumonia and diarrhea, together with diphtheria, caused one third of all deaths and one third of all deaths were among children less than 5 years of age. The shift away from infectious diseases to chronic diseases as leading causes of death, and the resulting increased life expectancy and decreasing childhood mortality, were the result of improvements in sanitation and hygiene, the discovery of antibiotics and the implementation of universal childhood vaccination programs. Vaccine campaigns in all states have virtually eliminated many diseases that had been common in the US (Table). In fact, we live in an age when many vaccine preventable diseases that were common are now so rare the majority of health care professionals have never seen them. For this reason, a summary of the clinical picture and epidemiology of three vaccine preventable diseases is provided below.

Table

	20th Century ~ Annual Morbidity	2006 Reported Cases	2007 Reported Cases	Reduction
Smallpox	29,005	0	0	100%
Diphtheria	21,053	0	0	100%
Measles	4,000,000	55	29	99%
Mumps	162,344	6584	900	99%
Pertussis	200,752	14153	10454	95%
Polio (paralytic)	16,316	0	0	100%
Rubella	47,745	11	12	99%
CRS	152	1	0	100%
Tetanus	580	41	28	95%

Measles:

Clinical manifestations: Measles is caused by a paramyxovirus which is easily spread person to person through airborne respiratory droplets. Patients usually have a prodromal fever that increases gradually to 103 degrees, cough, coryza and conjunctivitis, and Koplik spots (white spots on an erythematous base on the buccal mucosa). On about the 3rd to 7th day, patients develop a blotchy rash starting at the hair line on the forehead and behind the ears and becoming generalized over a three day period (Figure 1).

As the rash progresses it becomes confluent and darkens to a brownish color. The rash usually lasts 4 to 7 days, and is followed by desquamation of the more severely affected areas. The fever peaks during the 2nd or 3rd day of rash then falls over a 24 hour period. Approximately 20% of reported measles cases experience one or more complications. These complications are more common among children under 5 years of age and adults over 20 years old. Viral pulmonary infection is common early in the illness. Bacterial superinfection causing pneumonia also occurs, usually as the result of common pathogens such as *S. pneumoniae* and *S. aureus*. Younger measles cases are commonly complicated by otitis media (5 – 15%) and by laryngitis. Myocarditis and pericarditis occur occasionally. Neurologic abnormalities manifested by abnormal EEG results are very common immediately after illness. Clinically evident encephalitis occurs in about 1 out of 1,000 cases, with resulting brain damage in 20 to 40% of encephalitis cases. Subacute sclerosing panencephalitis (SSPE) is a rare degenerative central nervous system disease resulting from persistent measles virus infection. The risk of SSPE among individuals who previously had measles is about 1 in 100,000. The measles mortality rate is 1 to 2 per 1,000 cases, however, in countries where children are often malnourished, the mortality rate 10% to 25%. Measles during pregnancy can also lead to miscarriage, prematurity, or a low-birth-weight infant.

Figure 1 – Child with measles on third day of rash



Courtesy of CDC, Public Health Image Library, available at <http://phil.cdc.gov/phil> image ID#1150

Epidemiology:

US: There were an estimated 4 million measles cases per year in the US prior to widespread vaccine use. In the US, since 1993, the largest outbreaks of measles have occurred due to spread from imported cases among groups that refuse immunizations due to religious or philosophical reasons. On average, in the years 2000-2007, 63 cases of measles were reported in the US annually. In 2008, through December 6, 134 cases have been reported from 15 states and the District of Columbia. Of the 131 cases for whom details have been analyzed, fifteen (11%) were hospitalized, with no deaths. Seventeen of the cases were imported, 9 from European countries, and 8 from other countries around the world. Nine of these imported cases were in US

residents who had traveled abroad. Seventy-six percent were linked to the imported cases, and the source of measles acquisition could not be determined for 11%. Of the 123 who were US residents, 112 (91%) were unvaccinated or had unknown vaccine status, and of the 95 (85%) who were eligible for vaccination, 63 (66%) were unvaccinated due to religious or philosophical reasons.

Mississippi: There has been one confirmed case of measles in Mississippi in the past decade, in 2002, in a non-resident of the state. A young unvaccinated woman became infected in a measles endemic country in Africa. She was ill while traveling back to the United States, which set in motion an investigation in which travelers in three airplanes which originated in three different countries were notified of their possible exposures. She visited friends in Mississippi while ill, and contacts were assessed for symptoms and tested for immunity. Prior to this case, the most recent year in which measles was reported was 1992, when an outbreak occurred among students at a Mississippi university resulting from a student who had been exposed while traveling in Europe. Fifteen cases occurred as a part of the outbreak, and 2 unrelated cases were also reported that year.

Worldwide: Large numbers of measles cases still occur in other countries where vaccine levels are inadequate, with at least 750,000 deaths in 2000 worldwide. It is estimated that 90% of these deaths were among children <5 years of age. In 2007, the estimated number of deaths worldwide was 197,000. Several European countries, including Switzerland, Austria and Italy, still have endemic measles occurring. Due to a drop in vaccination coverage in the United Kingdom, measles has once again become endemic 14 years after it was declared eliminated with 529 cases reported in England, Scotland and Wales, and one death in 2008.

Poliomyelitis:

Clinical manifestations: Poliomyelitis is caused by poliovirus, an enterovirus, and is spread primarily person to person through the fecal oral route. Ninety to 95% of those infected have no symptoms at all, 4 to 8% have a minor gastrointestinal illness, 1 to 2% experience a nonparalytic aseptic meningitis lasting 2 to 10 days, and less than 1% develop flaccid paralysis. Age is the strongest risk factor for paralytic disease and increases the risk of death. Paralytic polio is usually preceded by a prodromal illness consisting of fever, malaise, headache, nausea and vomiting for 1 to 10 days, followed by severe muscle pain, back and neck stiffness, and asymmetric flaccid paralysis that progresses for 2 to 3 days. Many recover completely and most have at least some muscle function return. Weakness or paralysis present 60 days after illness is usually permanent. There are three types of paralytic polio: spinal (79%

of cases) – asymmetric paralysis, usually of the legs; bulbar (2%) - weakness of muscles innervated by cranial nerves; and bulbo-spinal (19%) - a combination. There is a 2 to 5% mortality rate among children and 15 to 30% among adults. The mortality rate is 25 to 75% with bulbar involvement as this affects breathing (Figure 2).

Figure 2 – Child with paralytic polio in an “iron lung”



Courtesy of the World Health Organization, available at <http://www.vaccineinformation.org/polio/photos.asp>

Epidemiology:

US: Prior to polio vaccine use, as the socioeconomics and sanitation improved, the pattern of viral transmission changed. There was less frequent exposure which increased the age of those infected. Individuals infected at an older age were more likely to have paralytic sequelae than those infected as infants, who most often had asymptomatic infection. The number of susceptible persons accumulated and epidemics occurred. The incidence peaked in 1952 with more than 21,000 cases of paralytic disease. Following the introduction of effective vaccine, the incidence dropped rapidly. In 1960 there were 2525 paralytic cases reported, and 61 cases were reported in 1965. The last cases of paralytic poliomyelitis caused by endemic transmission of wild virus in the US were in 1979, when an outbreak occurred among the Amish in several Midwest states. The virus was imported from the Netherlands. The last imported case was reported in 1993.

Mississippi: The peak number of cases of polio in MS occurred in 1951 with 732 cases reported. From 1964 through 1976, the average number of cases per year was less than 1. In 1976 the last year paralytic polio was reported in MS.

Worldwide: Although there currently is no polio in the US, it is still endemic in four countries (Afghanistan, India, Nigeria and Pakistan). In 2007, there were 1310 cases of paralytic polio reported worldwide, 106 (8%) of these were in countries where polio was reintroduced through importation.

Rubella:

Clinical manifestations: Rubella (German measles) is usually a mild rash illness caused by rubella virus, a Togavirus that is transmitted person to person through respiratory droplets. Children usually experience a fever accompanied by a diffuse punctuate and maculopapular rash that is indistinguishable from other viral rash illnesses. Adults may experience a prodrome of fever, headache, coryza and conjunctivitis, but children seldom do. Approximately 50% of those infected will be asymptomatic. Although mild in children and adults, rubella has disastrous effects on the fetus of mothers infected during the first trimester of pregnancy. Up to 90% of the newborns infected early in utero will have congenital rubella syndrome (CRS). CRS consists of nerve deafness in 80 to 90 %, cataracts in 35% (Figure 3), intrauterine growth retardation in 50 – 85%, intrauterine death in 10 -30 %, patent ductus arteriosus in 30%, pulmonary arterial hypoplasia/stenosis in 25%, meningoencephalitis in 10 – 20% and many other more rarely occurring defects of the eye, ENT system, neurologic system, or cardiovascular systems. Multiple endocrinopathies and other ongoing autoimmunity disorders also occur as delayed manifestations.

Figure 3 - Infant with cataracts due to Congenital Rubella Syndrome



Courtesy of CDC, Public Health Image Library, available at <http://phil.cdc.gov/phil> image ID#1150

Epidemiology:

US: During the 1962--1965 worldwide rubella epidemic, an estimated 12.5 million cases of rubella occurred in the United States, resulting in 2,000 cases of encephalitis, 11,250 fetal deaths, 2,100 neonatal deaths, and 20,000 infants born with CRS. Rubella vaccine was licensed for use in 1969. The number of rubella and CRS cases declined steadily until the late 70's, when a resurgence of rubella cases occurred among young adults with an accompanying resurgence of CRS. Another resurgence took place in the late 1980's and early 90's, largely due to outbreaks occurring among unvaccinated adults in congregate setting such as colleges, workplaces, prisons and in religious communities that did not accept vaccination.

In 1990, the Advisory Committee for Immunization Practices recommended the 2 dose vaccination schedule. By the late 1990's most cases were among Hispanic foreign-born populations. During 2001 – 2004, 4 cases of CRS were reported to CDC, three of whom were born to foreign born mothers. In 2004 CDC declared rubella was no longer endemic in the US. However, imported rubella still occurs and in 2005, CRS was diagnosed in an infant born in New Hampshire to Liberian refugee parents.

Mississippi: The last rubella case was reported in Mississippi in 1986, in a four year old.

Worldwide: The Pan American Health Association is currently working to eliminate rubella in the Americas, where in 2007, 975 suspected CRS cases were reported in the 34 countries with CRS surveillance. Brazil, Chile, Colombia and Peru accounted for 947 (97%) of these cases.

Summary: Through vaccine development, public health programs, and private physician efforts, many diseases that caused mortality and morbidity in the 20th century, especially in children, are now uncommon in the US. Most of these diseases are still common in other parts of the world, and we must maintain our vaccination rates to assure our children's continued protection.

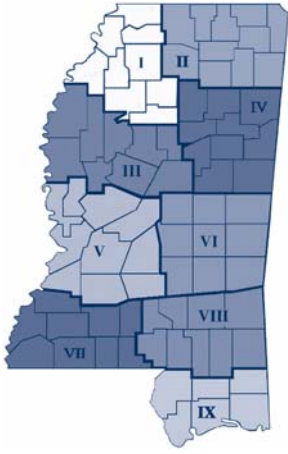
References

- CDC. Achievements in public health, 1900-1999: control of infectious diseases. MMWR 1999; 48(29):621-29.
- CDC. Vaccines and immunizations: measles disease in-short. Available online at: <http://www.cdc.gov/vaccines/vpd-vac/measles/in-short-adult.htm> Accessed Dec. 2, 2008.
- CDC. Update: Measles---United States, January-July 2008. MMWR 2008;57(33):893-96.
- CDC. Progress in global measles control and mortality reduction, 2000—2007. MMWR 2008;57(48):1303-06.
- CDC. Epidemiology and prevention of vaccine-preventable diseases, 2008. 10th ed.: 102-4.
- Mandell G, Bennett J, Dolin R. Principles and practice of infectious diseases, 2005. 6th ed.: 2142.
- Feigin R, Cherry J. Textbook of pediatric infectious diseases, 1998. 4th ed.:2061-66.
- CDC. Progress toward interruption of wild poliovirus transmission---worldwide, January 2007—April 2008. MMWR 2008; 57(18):489-494.
- CDC. Parents' guide to childhood immunization. Available online at: http://www.cdc.gov/vaccines/vpd-vac/polio/downloads/pg_why_vacc_polio.pdf Accessed Dec. 13, 2008.
- CDC. Achievements in public health: elimination of rubella and congenital rubella syndrome---United States, 1969—2004. MMWR 2005; 54(11):279-282.
- CDC. Brief report: Imported case of congenital rubella syndrome---New Hampshire, 2005. MMWR 2005; 54(45):1160-61.
- CDC. Progress toward elimination of rubella and congenital rubella syndrome---the Americas, 2003—2008. MMWR 2008;57(43):1176-79.
- CDC. National Center for Health Statistics. Vital statistics of the United States, 1900-1984. Available online at: <http://www.cdc.gov/nchs/products/pubs/pubd/vsus/1963/1963.htm#1940> Accessed Dec. 2008.
- United States Public Health Service. Vital Statistics Rates in the United States, 1900-1940. Available online at: http://www.cdc.gov/nchs/data/vsus/vsrates1900_40.pdf Accessed Dec. 2008.

Mississippi

Provisional Reportable Disease Statistics

November 2008



		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Nov 2008	Nov 2007	YTD 2008	YTD 2007
Sexually Transmitted Diseases	Primary & Secondary Syphilis	0	0	0	0	4	1	0	1	5	11	7	160	107
	Total Early Syphilis	1	2	0	0	8	2	0	4	8	25	21	352	347
	Gonorrhea	46	42	102	73	145	68	29	76	52	633	732	6,841	7,786
	Chlamydia	213	149	284	239	484	167	159	176	190	2,061	1,782	19,364	20,269
	HIV Disease	6	2	5	2	11	4	3	4	3	40	49	555	550
Mycobacterial Diseases	Pulmonary Tuberculosis (TB)	1	0	1	0	4	0	0	0	0	6	13	79	104
	Extrapulmonary TB	0	0	0	0	0	0	0	0	0	0	1	16	11
	Mycobacteria Other Than TB	4	2	0	1	6	2	2	4	4	25	22	274	224
Vaccine Preventable Diseases	Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pertussis	0	0	0	0	1	0	0	1	0	2	21	93	250
	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	2
Viral Hepatitis	Hepatitis A (acute)	0	0	0	0	1	0	0	0	0	1	0	5	8
	Hepatitis B (acute)	0	0	1	0	1	0	0	0	2	4	3	48	41
Enteric Diseases	Salmonellosis	2	14	2	7	11	4	5	6	7	58	83	1018	1010
	Shigellosis	0	0	0	0	1	0	0	0	0	1	291	285	1292
	Campylobacter Disease	0	0	0	0	1	0	1	1	0	3	5	103	119
	E. coli O157:H7/HUS	0	0	0	1	0	0	0	0	0	1	0	5	6
Other Conditions of Public Health Significance	Invasive Meningococcal Disease	0	0	0	0	0	0	0	0	0	0	1	11	11
	Invasive <i>H. influenzae</i> b Disease	0	0	0	0	0	0	0	0	0	0	0	2	0
	RMSF	0	0	0	0	0	0	0	0	0	0	3	7	20
	West Nile Virus	0	0	0	0	0	0	0	0	0	0	2	99	132
	Lyme Disease	0	0	0	0	0	0	0	0	0	0	0	1	2
	Animal Rabies (bats)	0	0	0	0	0	0	0	0	0	0	0	2	2

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

Influenza Update – Reported resistance to oseltamivir

Adapted from: CDC. Update: Influenza activity — United States, September 28–November 29, 2008. MMWR 2008;57:1329-32.

With limited influenza activity in the United States, few viruses have been available for antiviral resistance testing. Since September 28, 2008, 39 influenza viruses from 11 states have been tested for antiviral resistance; of the viruses tested, 28 (71.8%) were collected from only two states. Preliminary data show that 24 of the 25 influenza A (H1N1) isolates tested were resistant to oseltamivir; all H1N1 isolates were sensitive to zanamivir. All five influenza A (H3N2) and the nine influenza B isolates tested were sensitive to oseltamivir and zanamivir. Twenty-five influenza A (H1N1) isolates and five influenza A (H3N2) isolates were tested for adamantane resistance. All influenza A (H1N1) isolates were sensitive to adamantanes, and all influenza A (H3N2) isolates tested were resistant to adamantanes. The adamantanes are not effective against influenza B viruses.

Currently, data on antiviral resistance, and information on which influenza virus types or subtypes will circulate, are insufficient to provide an indication of the prevalence of antiviral resistance at a national or regional level during this season. CDC has solicited a representative sample of viruses from WHO collaborating laboratories in the United States for resistance testing throughout the season, and more specimens are expected as influenza activity increases.

One culture from a Mississippi resident has been positive for influenza virus so far this season. The case is from the Hattiesburg area and the virus grown was influenza B. Please continue to remind your patients to be vaccinated against influenza.