Mississippi State Department of Health

Mississippi Morbidity Report

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2014-2015 Influenza Update: Reduced Influenza Vaccine Effectiveness

Key messages:

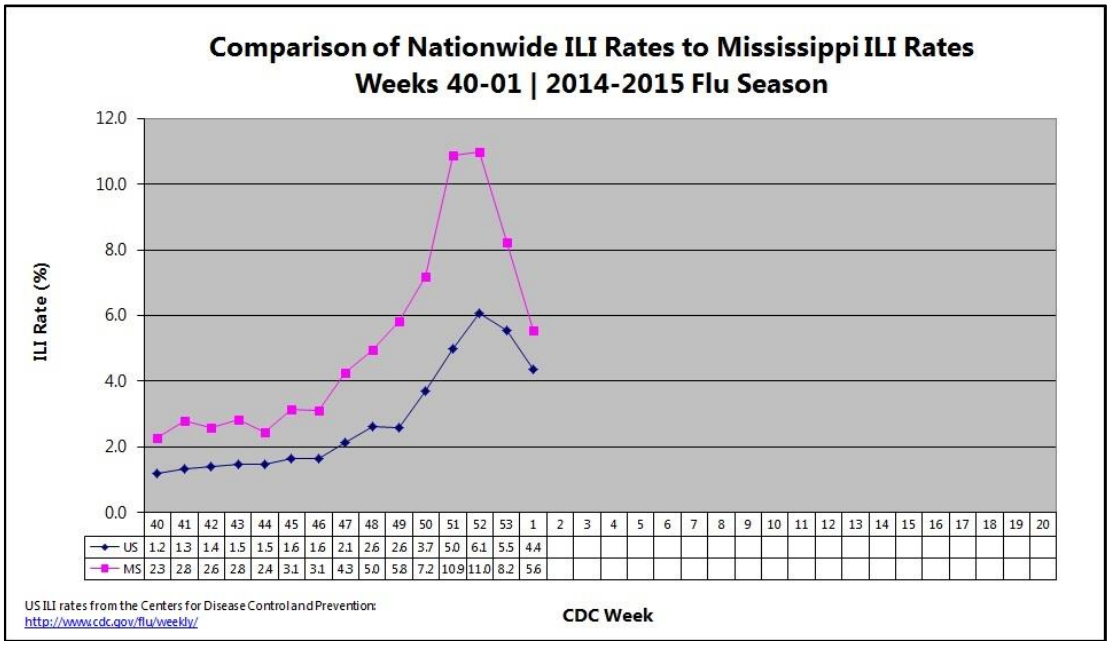
- **Approximately two thirds of circulating influenza A H3N2 viruses (the predominant flu strain this season) are antigenically different or "drifted" from the vaccine strain, leading to a vaccine mismatch;**
- **Early estimates of vaccine effectiveness are low when compared to previous seasons;**
- **Vaccine is still recommended because it can prevent infections due to other circulating viruses and can reduce the risk of serious influenza related complications and hospitalizations;**
- **Early treatment and chemoprophylaxis with antivirals can reduce the transmission of influenza (especially in institutional settings) and reduce complications associated with influenza infection.**

Introduction: The 2014-2015 influenza season has been characterized by the early recognition of a circulating strain of influenza A H3N2 virus that is antigenically and genetically different (or "drifted") from the influenza A H3N2 component in this season's influenza vaccine. The predominant strain of influenza causing illness thus far this season, both in Mississippi and the US, is influenza A H3N2, and the "drifted" strain is accounting for approximately two thirds of all H3N2 viruses analyzed. The mismatch between the circulating viruses and the vaccine component has lead to decreased vaccine effectiveness when compared to prior seasons, as outlined in a recent CDC report (see below). Historically, influenza seasons in which H3N2 is the predominant strain have had significant impact on individuals >65 years of age and children <5 years of age, leading to increased influenza related complications, hospitalizations and deaths. What follows is an overview of the 2014-2015 season to date, excerpts from the recent CDC report describing early season vaccine effectiveness estimates, and recommendations for the early use of antivirals, especially important this season.

Mississippi 2014-2015 Influenza Season: The Mississippi State Department of Health (MSDH) monitors influenza activity through a network of sentinel providers located in outpatient clinics, hospital emergency departments and student health centers throughout the state. Each week the sentinel providers report the number of patient visits consistent with an influenza-like illness (ILI), defined as fever of 100°F or higher and cough and/or sore throat. These reports are used to estimate the magnitude and geographic spread of influenza in the state. To date, the highest activity for the 2014-2015 season has been reported during the week ending December 27, 2014 (CDC week 52) when 11% of patient visits to sentinel providers were consistent with ILI (Figure). Sentinel providers also submit samples for influenza PCR testing to the Mississippi Public Health Laboratory (MPHL). The predominant subtype in Mississippi and the U.S. for the 2014-2015 season thus far has been influenza A (H3N2). Representative samples from the MPHL are submitted to CDC for antigenic characterization and thus far 55% of the samples have been identified as the drifted strain. See the MSDH website for current influenza surveillance reports at: http://msdh.ms.gov/msdhsite/_static/14,0,199,629.html

In spite of steady declines in activity since reaching a peak in December, influenza activity has remained elevated, with widespread transmission still occurring in all areas of the state. Long term care facilities in Mississippi have been significantly impacted during the 2014-2015 season. As of January 30, 2015, more than 50 separate influenza outbreaks have been reported in nursing homes and assisted living centers, compared to only five reported for the entire 2013-2014 influenza season. Data available for 22 of the outbreaks document 26 influenza associated hospitalizations and three influenza deaths related to the outbreaks. While the percentage of residents receiving influenza vaccine was high at 79%, only 16% of residents received the high dose vaccination recommended for individuals >65 years. Additionally, as seen in previous seasons, the total percentage of staff receiving influenza vaccination was only about 40%.

Figure



US 2014-2014 Influenza Season: Nationally, the highest US influenza activity has also occurred during CDC week 52, with an ILI rate of 6.1%. As seen in Mississippi, activity has steadily declined over the last several weeks, but remains widespread in 44 states as reported for CDC week 3 (the week ending January 24, 2015). Seasons predominated by influenza A H3N2 (as seen in both the US and Mississippi) are often more severe, affecting the extremes of age, as measured by hospitalizations and pediatric deaths. The overall hospitalization rate to date is 40.1 per 100,000 population with the highest rate among adults aged 65 years and older (198.4 per 100,000 population), followed by children aged 0-4 years (38.2 per 100,000 population), similar to the 2012-2013 season, the last season predominated by H3N2. Additionally, as of January 24, there have been 61 influenza-associated pediatric deaths (children <18 years) reported in the U.S. for the 2014-2015 season. There have been no reported pediatric deaths in Mississippi for the 2014-2015 season. See the CDC website at http://www.cdc.gov/flu/weekly/ for weekly influenza surveillance reports.

Submitted by Michael Jacobson, CDC Public Health Associate, MSDH Office of Epidemiology

CDC Report: The CDC has recently released a Morbidity and Mortality Weekly Report, which is excerpted below, providing early estimates of vaccine effectiveness for the 2014-2015 season and highlighting the importance of antivirals. The full report "Early Estimates of Seasonal Influenza Vaccine Effectiveness—United States, January 2015" (January 16, 2015/64(01);10-15) may be accessed on the CDC website at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6401a4.htm?s_cid=mm6401a4_w

Early Estimates of Seasonal Influenza Vaccine Effectiveness- United States, January 2015

In the United States, annual vaccination against seasonal influenza is recommended for all persons aged ≥6 months. Each season since 2004–05, CDC has estimated the effectiveness of seasonal influenza vaccine in preventing medically attended acute respiratory illness (ARI) associated with laboratory-confirmed influenza. This season, early estimates of influenza vaccine effectiveness are possible because of widespread, early circulation of influenza viruses. By January 3, 2015, 46 states were experiencing widespread flu activity, with predominance of influenza A (H3N2) viruses. This report presents an initial estimate of seasonal influenza vaccine effectiveness at preventing laboratory-confirmed influenza virus infection associated with medically attended ARI based on data from 2,321 children and adults enrolled in the U.S. Influenza Vaccine Effectiveness Network (Flu VE) during November 10, 2014–January 2, 2015. During this period, overall vaccine effectiveness (VE) (adjusted for study site, age, sex, race/ethnicity, self-rated health, and days from illness onset to enrollment) against laboratory-confirmed influenza associated with medically attended ARI was 23% (95% confidence interval [CI] = 8%–36%). Most influenza infections were due to A (H3N2) viruses.

This interim VE estimate is relatively low compared with previous seasons when circulating viruses and vaccine viruses were well-matched and likely reflects the fact that more than two-thirds of circulating A (H3N2) viruses are antigenically and genetically different (drifted) from the A (H3N2) vaccine component of 2014–15 Northern Hemisphere seasonal influenza vaccines.

The adjusted, age-stratified VE point estimates were 26% for persons aged 6 months–17 years, 12% for persons aged 18–49 years, and 14% for persons aged ≥50 years**.** Statistically significant VE was observed only among persons aged 6 months–17 years. These early, low VE estimates underscore the need for ongoing influenza prevention and treatment measures.

CDC continues to recommend influenza vaccination even when there are drifted viruses circulating because the vaccine can still prevent some infections with the circulating A (H3N2) viruses and might also prevent serious complications requiring hospitalization. Also, vaccine might protect against other influenza viruses that can circulate later. As of early November, 2014, fewer than half of U.S. residents had reported receiving influenza vaccine this season. Influenza vaccination, even when effectiveness is reduced, can prevent thousands of hospitalizations.

The severity and timing of influenza activity during the 2014–15 season has so far been similar to the moderately severe 2012–13 season, the last season when influenza A (H3N2) viruses predominated. Rates of influenza-associated hospitalization so far this season are similar to rates during 2012–13, with highest hospitalization rates among persons aged ≥65 years.

These early VE estimates underscore the need for additional influenza prevention and treatment measures, especially among persons aged ≥65 years, young children, and other persons at higher risk for serious influenza associated complications. Influenza antiviral medications should be used as recommended for treatment in patients, regardless of their vaccination status. Antiviral treatment can reduce the duration of illness and reduce complications associated with influenza Antiviral treatment should be used for any patient with suspected or confirmed influenza who is hospitalized, has severe or progressive illness, or is at high risk for complications from influenza, even if the illness seems mild. Persons at high risk include young children (especially children aged <2 years), pregnant women, persons with chronic medical conditions like asthma, diabetes, or heart disease, and adults aged ≥65 years.

Ideally, antiviral treatment should be initiated within 48 hours of symptom onset, when treatment is most effective. However, antiviral treatment initiated later than 48 hours after illness onset can still be beneficial for some patients. Observational studies of hospitalized patients suggest some benefit when treatment was initiated up to 4 or 5 days after symptom onset. Clinical judgment, on the basis of the patient's disease severity and progression, age, underlying medical conditions, likelihood of influenza, and time since onset of symptoms, is important when making antiviral treatment decisions for outpatients. The decision to initiate antiviral treatment should not be delayed pending laboratory confirmation of influenza, especially if performed by insensitive assays, such as rapid influenza diagnostic tests. Health care providers should advise patients at high risk to call promptly if they get symptoms of influenza. Also, clinicians should have a high index of suspicion for influenza while influenza activity is widespread. Alternative strategies, such as health care provider–operated telephone triage, might enable patients at high risk to discuss symptoms over the phone and facilitate early initiation of treatment.

Tdap (Tetanus, Diphtheria and Pertussis) Immunization Recommendation for Pregnant Women

Due to the high rate of adverse outcomes from pertussis ("whooping cough") in newborns, the CDC Advisory Committee on Immunization Practice recommends that all pregnant women receive the Tdap vaccine with every pregnancy, between 27 and 36 weeks gestation. This recommendation is supported by the American College of Obstetricians and Gynecologists and the American College of Nurse-Midwives.

Approximately 50% of infants with pertussis require hospitalization, 23% get pneumonia and 1.6% die. In 2013 there were 4,051 infant cases of pertussis in the U.S. with 13 deaths. Mississippi recorded infant deaths from pertussis in 2010 and 2012. Immunization of the mother in the third trimester maximizes maternal antibody response and passive transfer, providing protective immunity for the newborn until infant immunizations for pertussis can be completed. A recent study published in *Clinical Infectious Diseases* found this approach to be 93% effective for preventing pertussis in newborns within the first eight weeks of life[1]. **Immunization of pregnant women with Tdap is a covered service for most private insurance companies and the Mississippi Division of Medicaid.**

1. Dabrera G, Amirthalingam G, Andrews N, et. Al. A Case-Control Study to Estimate the Effectiveness of Maternal Pertussis Vaccination in Protecting Newborn Infants in England and Wales, 2012–2013. Clin Infect Dis. 2015;60(3):333-337.

Mississippi School Entry Immunization Requirements, 2015

In order to enroll in any public or private kindergarten, elementary, or secondary school in Mississippi, a student must provide the school with a:

Certificate of Immunization Compliance (Form 121) MUST be signed by the District Health Officer, a physician, or a nurse.

or a

Certificate of Medical Exemption (Form122 not computer generated).This form MUST be signed by the District Health Officer (refer to the Medical Exemption section for specific information.)

The list of immunizations required is specified by the State Health Officer and is promulgated at least annually as directed by state statute. All vaccines are to be given at the appropriate age and intervals according to ACIP recommendations. The required vaccines are listed below.

Mississippi School Entry Immunization Requirements[a]

Vaccine/antigen	No. of doses
Diphtheria, Tetanus, Pertussis (DTaP)[b]	5[c]
Polio (IPV)	4[d]
Hepatitis B	3
Measles, Mumps, Rubella (MMR)	2[e]
Varicella (chickenpox)	2[f]

a. All children entering a Mississippi school (any grade) for the first time will be required to have the above listed immunizations. This includes Pre-K 4 year olds-12th grade.

b. Children entering a Mississippi school after their 7th birthday who do not meet the above DTaP requirements, will need at least 3 total doses of diphtheria/tetanus containing vaccine (Td). Tdap should be used as 1 of the 3 diphtheria/tetanus containing vaccines (preferably as the lst of the 3 doses) for children age 10 years and older. Refer to the Advisory Committee on Immunizations Practices (ACIP) catch up schedule at http://www.cdc.gov/vaccines/pubs/pinkbook/index.html

c. If the 4th dose is received on or after the 4th birthday, a 5th dose is not required.

d. The final dose in the series should be administered at 4 years of age, regardless of number of previous doses. A 4th dose is not necessary if the 3rd dose was administered at age 4 years or older and at least 6 months following the previous dose.

e. MMR vaccine may only be waived if there is a documented physician's diagnosis of previous infection with measles, mumps and rubella disease or a serological confirmation of immunity to measles, mumps and rubella.

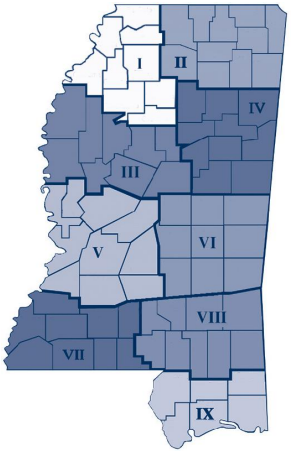
f. Varicella vaccine will be waived for evidence of past infection, including past history of chickenpox or a serological confirmation of immunity to chickenpox.

Mississippi 7th Grade School Immunization Requirements

Vaccine/antigen	No. of doses
Tdap (7th grade entry)	1[a]

a. Effective 2012-2013 school year all students entering, advancing or transferring into 7th grade will need proof of an adolescent whooping cough (pertussis) booster, aka Tdap vaccine, before entry into school in the fall. Tdap vaccine given on or after the 7th birthday meets the school requirement.

http://msdh.ms.gov/msdhsite/_static/resources/2029.pdf **Revised 1/12/2015**



Mississippi
Provisional Reportable Disease Statistics

December 2014

		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Dec 2014	Dec 2013	YTD 2014	YTD 2013
Sexually Transmitted Diseases	**Primary & Secondary Syphilis**	-	-	-	-	-	-	-	-	-	†	†	†	†
	Early Latent Syphilis	-	-	-	-	-	-	-	-	-	†	†	†	†
	Gonorrhea	-	-	-	-	-	-	-	-	-	†	†	†	†
	Chlamydia	-	-	-	-	-	-	-	-	-	†	†	†	†
	HIV Disease	-	-	-	-	-	-	-	-	-	†	†	†	†
Myco-bacterial Diseases	**Pulmonary Tuberculosis (TB)**	1	1	0	0	0	0	1	0	1	**4**	4	62	57
	Extrapulmonary TB	0	0	0	0	1	0	0	2	0	**3**	2	13	8
	Mycobacteria Other Than TB	1	7	4	1	5	3	1	1	5	**28**	43	378	381
Vaccine Preventable Diseases	**Diphtheria**	0	0	0	0	0	0	0	0	0	**0**	0	0	0
	Pertussis	1	0	0	0	0	1	0	0	0	**2**	4	65	60
	Tetanus	0	0	0	0	0	0	0	0	0	**0**	0	1	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	1	1	1	1	0	**4**	4	45	54
	Invasive *H. influenzae* disease	0	1	0	1	2	0	0	1	0	**5**	5	34	31
	Invasive Meningococcal disease	0	0	0	0	0	0	0	0	0	**0**	1	1	4
Enteric Diseases	**Hepatitis A (acute)**	0	0	0	0	0	0	0	0	0	**0**	1	3	5
	Salmonellosis	5	4	2	4	8	1	2	4	5	**35**	35	984	919
	Shigellosis	1	1	0	0	1	0	0	0	0	**3**	20	195	226
	Campylobacteriosis	1	0	0	0	0	0	0	0	1	**2**	10	102	99
	***E. coli* O157:H7/STEC/HUS**	0	0	0	0	0	1	0	0	0	**1**	1	33	30
Zoonotic Diseases	**Animal Rabies (bats)**	0	0	0	0	0	0	0	0	0	**0**	0	1	5
	Lyme disease	0	0	0	0	0	0	0	0	0	**0**	0	2	0
	Rocky Mountain spotted fever	0	0	0	0	0	0	0	0	0	**0**	0	36	39
	West Nile virus	0	0	0	0	0	0	0	0	0	**0**	0	42	45

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

†Data not available.