Epi Update
A publication of the Florida Department of Health, Bureau of Epidemiology

December 2008

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Epidemiology of Vaccine-Preventable Diseases, Part 1: Measles, Mumps, and Rubella

Leah Eisenstein, M.P.H., Kate Goodin, M.P.H., Brian Fox, M.A., and Janet Hamilton, M.P.H.

Vaccine-preventable diseases are still a serious threat to the population of the United States and Florida specifically. The results of the 2007 National Immunization Survey indicate that vaccination coverage for vaccines recommended routinely since 2000 and before reached record high levels (1). Despite this, outbreaks of vaccine-preventable diseases continue to occur in the United States. Recently, there has been an increase in the number of importation-associated cases as a result of viral transmission in the United States after importation of the virus. An increasing number of vaccine exemptions among children who attend school in states that allow philosophical exemptions also facilitates transmission. Importation-associated cases have occurred largely among school-aged children who were eligible for vaccination (2). This series of articles will examine the history of these diseases, the history of the vaccines, and the epidemiology of these diseases in Florida. Part One covers measles, mumps, and rubella, with other diseases discussed in subsequent articles.

Disease History

Measles is an acute viral disease characterized by fever, cough, runny nose, conjunctivitis, maculopapular rash, and Koplik spots, and tends to occur during the late spring and early winter. The disease can result in severe complications including ear infections in one out of every ten cases and pneumonia in one out of every 20. Acute encephalitis occurs in one out of every 1,000 cases of measles and can lead to permanent brain damage. In the modern era, death occurs in one to three out of every 1,000 measles cases in the United States. Measles was endemic in large metropolitan communities in the pre-vaccine era, with epidemics every second or third year.

During the pre-vaccine era, there were an estimated 100 million measles cases per year worldwide, and among cases there were approximately six million measles-related deaths per year. Almost all people (>90%) were naturally exposed to the measles virus and had immunity by the age of 20.

Measles was declared eliminated from the United States in 2000, though sporadic importation of cases from other countries continues to occur. An average of 63 cases was reported per year from 2000 to 2007 (2). In the United States in 2008 as of July, 131 cases have been reported, of which 89% were imported from or associated with importations from other countries (2). The importation-associated cases have occurred largely in school-aged children whose parents chose not to vaccinate (2).

Worldwide, measles is still common, with over 279,000 cases reported to the World Health Organization (WHO) in 2007, and it remains a leading cause of death among young children in developing countries (3, 4). However, measles is not limited to developing countries. Europe is currently facing a re-emergence due to low vaccination coverage levels. Large outbreaks are ongoing in Austria, Italy, and Switzerland where vaccination coverage is lower than in the United States (5). Fourteen years after endemic transmission was eliminated, measles was once again declared endemic in the United Kingdom in June 2008 following a drop in vaccination coverage levels (80%-85% among children aged two years) (5).

Mumps is an acute viral disease characterized by fever as well as swelling and tenderness of one or more salivary glands, usually the parotid gland, sometimes the sublinguinal or submaxillary glands. Testicular swelling occurs in 20%-30% of postpubertal males and can lead to testicular atrophy and rarely to sterility. Additional complications can include respiratory symptoms (40%-50% of cases), pancreatitis (4% of cases), and hearing loss. Aseptic meningitis occurs in up to 10% of mumps cases, but patients usually recover with no complications. Mumps encephalitis occurs in 0.01% to 0.02% of cases and can have serious complications including paralysis, seizures, hydrocephalus, and occasionally death, which occurs in 1% of mumps encephalitis cases. Mumps infection during the first trimester of pregnancy has a high risk of causing miscarriage (25%). In the absence of vaccination, mumps is endemic with an annual incidence over 100 cases per 100,000 population and epidemic peaks every two to five years. In the pre-vaccine era, most people (90%) were found to be immune by the age of 15 through natural exposure.

The number of mumps cases reported annually in the United States remained less than 300 per year from 2001 to 2005 (6). An outbreak in the Midwest involving 2,597 cases occurred between January 1 and May 2, 2006, possibly initiated by importation from the United Kingdom where a mumps epidemic peaked in 2005 (6,7). The epidemic did not result in any deaths, but did include 27 reports of orchitis, 11 meningitis, four encephalitis, four deafness, and one each of oophoritis, mastitis, pancreatitis, and unspecified complications (7). Due to this outbreak, a number of colleges have added mumps immunization as an entrance requirement.

Mumps remains endemic in many countries, with over 385,000 cases reported to the WHO in 2007 (8). The mumps vaccine is included in routine national immunization programs in only 57% of WHO member-countries (9).

Rubella is a mild febrile viral disease with a diffuse punctuate and maculopapular rash. It is often confused with measles, parvovirus infection, and others. Up to 50% of infections are subclinical, which does not allow for diagnosis based on symptoms. The most serious effects of rubella infection are experienced by a developing fetus. Congenital Rubella Syndrome (CRS) occurs in

up to 90% of infants born to women infected during their first trimester, even if the mother's infection is subclinical. Congenital malformations experienced by infants with CRS include deafness, cataracts, microcephaly, meningoencephalitis, mental retardation, atrial or ventricular septal defects, and others. Insulin-dependent diabetes has also been identified as a manifestation of CRS that may develop later in life. Rubella was endemic in the United States in the pre-vaccine era with epidemic periods every five to nine years. The most notable rubella epidemic in the United States occurred in 1964-1965 where there were 12.5 million rubella cases, over 20,000 CRS cases, and 11,000 fetal deaths.

Today, fewer than 25 rubella cases are reported each year in the U.S. with an average of one CRS case per year (10). In 1998, the United States adopted a goal of eliminating indigenous rubella and CRS by the year 2010 (10). However, rubella remains a common disease worldwide, with over 185,000 cases reported to the WHO in 2007 (11). In particular, China, Bangladesh, Egypt, Poland, and the Russian Federation accounted for 82% of these cases (11).

Vaccines History

Millions of people have benefited from vaccines for more than two centuries. Vaccination is one of a small group of medical interventions with direct and simultaneous benefits to individuals and communities. Sustained person-to-person disease transmission is more difficult in populations with large numbers of immune people. The more vaccinated individuals there are in a community, the less likely susceptible people will be exposed to the disease, which translates into protection known as herd immunity.

The MMR combines vaccines for Measles, Mumps, and Rubella into one shot. The MMR has been available since 1971, although its three components were licensed separately during the 1960s. It is a live vaccine, containing measles, mumps, and rubella viruses that have been “attenuated” (weakened), so they will not cause disease. Most children who get the vaccine develop immunity to all three diseases (over 99% for measles and 95% for mumps and rubella). Protection is believed to be life-long. Two doses of vaccine are recommended, with the first dose given at 12–15 months of age. The second dose may be given as soon as four weeks after the first, but it is usually given at four to six years of age. Measles, mumps, and rubella vaccines may be given separately, although these individual vaccines are not always readily available. Doctors prefer to administer the combined vaccine because it provides the child with simultaneous immunity, and fewer shots have to be administered in fewer office visits. Children who have received the MMR vaccine cannot infect other people.

The 2007 National Immunization Survey found that 92.3% of children aged 19 to 35 months nationwide had one or more doses of the MMR vaccine. The same survey estimated coverage in Miami to be 95.4% and 91.8% in the rest of Florida, for a statewide average of 92.3%.

Epidemiology in Florida

Recently, Rousch, et al. published a compilation of VPD morbidity and mortality data for the United States, providing the basis for a similar summary of Florida data (12). The following tables and charts have been compiled from surveillance data collected in Florida over the past 73 years to quantify and visually assess the impact that vaccination practices have had on the burden of disease in Florida. Table 1 depicts the precipitous decline in the number of reported measles, mumps, and rubella cases and deaths after widespread use of vaccination. While comparing the number of measles, mumps, and rubella cases in 2007 to the number of cases in 1934 is certainly meaningful, this may not be a fair comparison due to the drastic change in Florida’s population over time. Florida’s population has grown from just under 1.6 million residents in 1934 to over 18.5 million in 2005; a larger population would be expected to have a larger number of cases, all

else being equal. To address this, the 2007 population (18,762,014 residents) was used to estimate the number of cases that would have been reported for each year, had the population size been comparable to the 2007 population. This standardized estimate was calculated by dividing the 2007 population by the population for a given historical year to get a population ratio. The number of cases reported for that given year was multiplied by the population ratio. For example, the 2007 population (18,762,014 residents) was 10.1 times the population in 1939 (1,853,660 residents). The number of cases reported in 1939 was multiplied by 10.1 to estimate the number of cases that would have been reported in 1939 if the 1939 population were equal to the 2007 population. Table 2 presents a summary of these standardized estimates of select vaccine-preventable disease cases occurring in census years for 1940 to 2000. These standardized estimations are represented in Charts 1-3 as a dashed line. The actual number of cases reported for each year is represented in the charts as a solid line. Note that as the population size approaches the 2007 population, the dashed line and the solid line converge.

When calculating estimates of case or death counts for a disease to adjust for an increase in population over time, it is important to consider advances in medicine that have occurred over the same time. For example, case-fatality rates from measles, mumps, and rubella might be lower today than they were in the early 1900s because of the improved health status of the population and better medical care. For some diseases, such as diphtheria and pertussis, there might be fewer cases today in the absence of a vaccine due to the availability of treatment and/or prophylaxis.

Thanks to vaccines, measles, mumps, and rubella cases have become rare in Florida. However, these diseases still exist and could once again become common if vaccination coverage does not continue at high levels. This was demonstrated by the recent outbreaks of measles in unvaccinated school-aged children in Washington and Illinois.

Table 1: Average Measles, Mumps, and Rubella Cases and Deaths Pre-Vaccine Compared to Post-Vaccine (2007) in Florida

Disease (Pre-Vaccine Years Averaged)	Pre-Vaccine		Year Vaccine in Wide Use	Post-Vaccine (2007)	
	Cases/ Year	Deaths/ Year		Cases	Deaths
Measles (1953-1962)	5,723	11	1968	5	0
Mumps (1963-1968)	3,732	1	1967	21	0
Rubella* (1966-1969)	1,580	1	1969	0	0

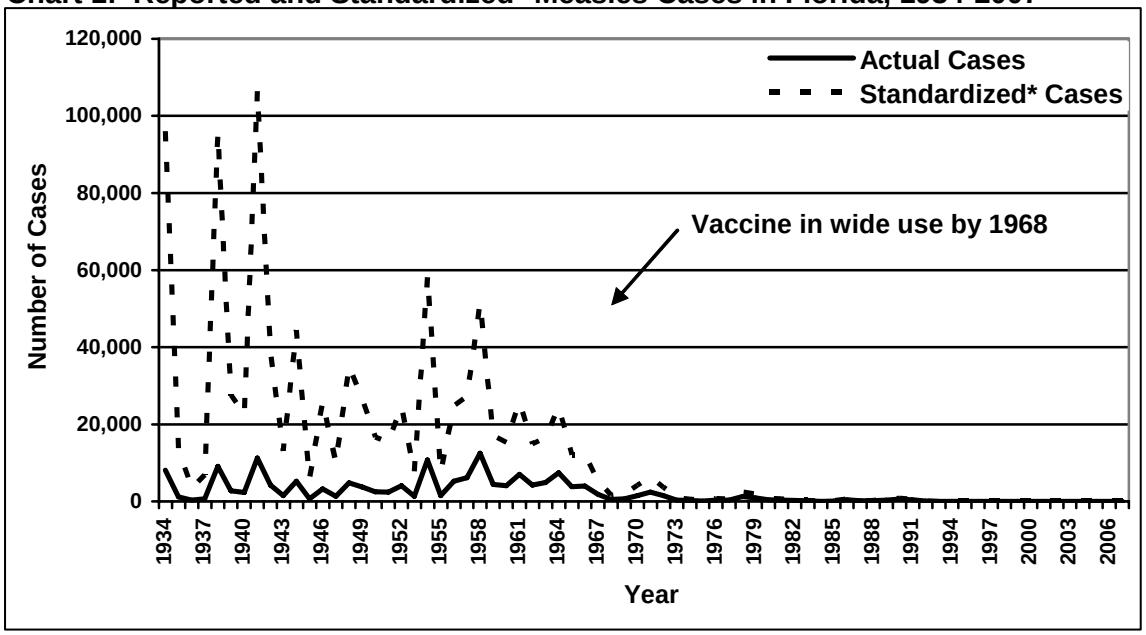
*Congenital Rubella Syndrome cases are not included.

Table 2. Summary of Standardized Estimates* of Measles, Mumps, and Rubella Cases Occurring in Census Years 1940 through 2000

Year	Measles	Mumps	Rubella
1940	22,581	2,596	1,479
1950	16,620	9,657	299
1960	15,362	16,476	3,130
1970	4,160	8,309	9,829
1980	826	373	208
1990	855	281	24
2000	2	8	2

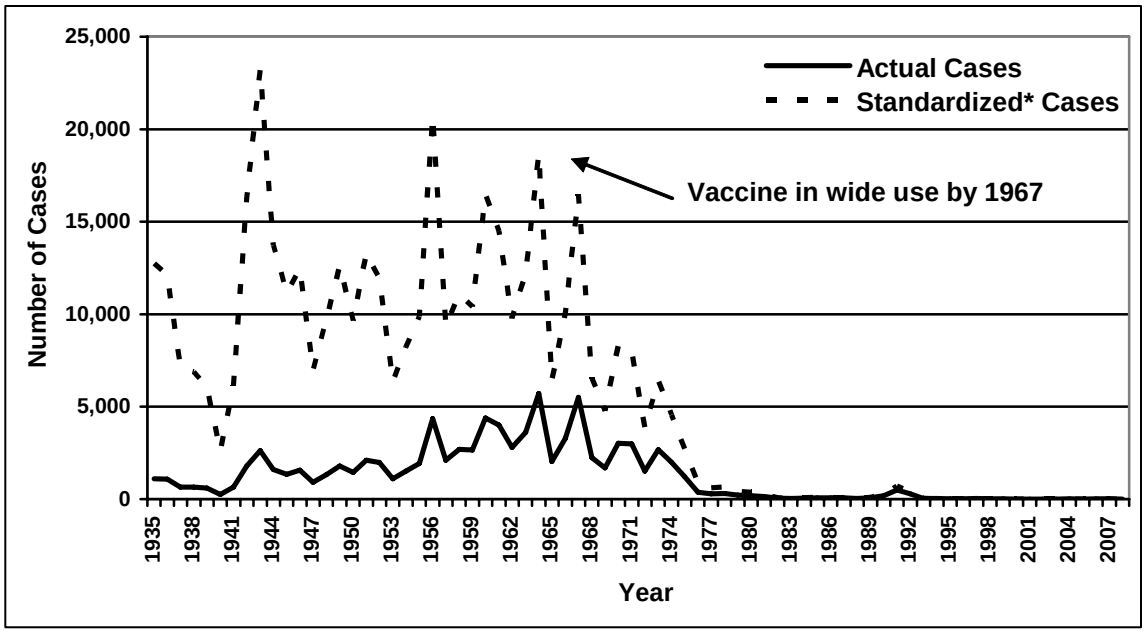
*Number of cases that would have occurred in Florida each year if Florida had a population of 18,762,014 (see text for further explanation).

Chart 1: Reported and Standardized* Measles Cases in Florida, 1934-2007



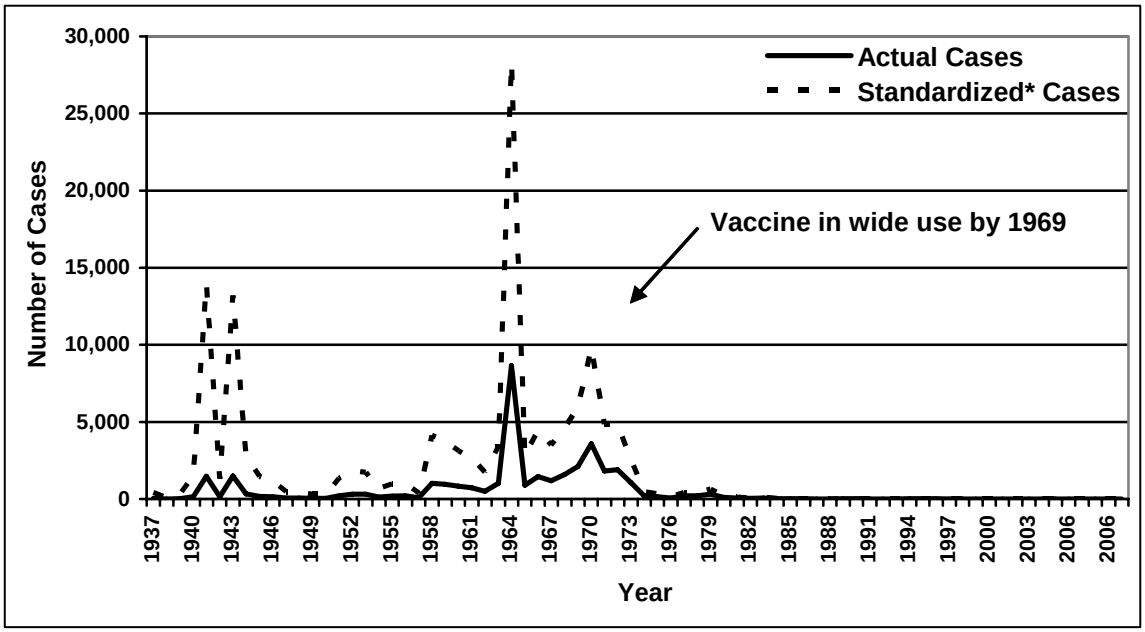
*Number of cases that would have occurred in Florida each year if Florida had a population of 18,762,014 (see text for further explanation).

Chart 2: Reported and Standardized* Mumps Cases in Florida, 1935-2007



*Number of cases that would have occurred in Florida each year if Florida had a population of 18,762,014 (see text for further explanation).

Chart 3: Reported and Standardized* Rubella Cases in Florida, 1937-2007



*Number of cases that would have occurred in Florida each year if Florida had a population of 18,762,014 (see text for further explanation).

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11. WHO. Rubella reported cases. Updated August 26, 2008. Available online: http://www.who.int/immunization_monitoring/en/globalsummary/timeseries/tsincidencerub.htm.
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Additional Resources

1. Bureau of Immunization website**:** http://www.doh.state.fl.us/disease_ctrl/immune/index.html
2. Bureau of Epidemiology, Annual Morbidity Statistics Reports: http://www.doh.state.fl.us/disease_ctrl/epi/Morbidity_Report/amr.html
3. CDC websites:
   Measles
   http://www.cdc.gov/ncidod/diseases/submenus/sub_measles.htm
   Measles Vaccination
   http://www.cdc.gov/vaccines/vpd-vac/measles/default.htm
   Mumps
   http://www.cdc.gov/ncidod/diseases/submenus/sub_mumps.htm
   Mumps Vaccination
   http://www.cdc.gov/vaccines/vpd-vac/mumps/default.htm
   Rubella
   http://www.cdc.gov/rubella/

MMR Vaccine Safety
http://www.cdc.gov/vaccinesafety/vsd/mmrv.htm

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Creutzfeldt-Jacob Disease Cases in Citrus County:

Why we DID NOT have Mad Cow Disease in Citrus County

Virginia Crandall, R.N., B.S.N., M.P.

In 1996, the *Lancet* published findings about a new variant of Creutzfeld-Jacob disease (vCJD) in the United Kingdom (U.K.). Ten cases were identified in the U.K. and others were identified in Europe. These had a "new neuropathological profile". Other consistent features that are unusual include the young age of the cases, clinical findings, and the absence of the electroencephalogram features typical for CJD.

Transmissible Spongiform Encephalopathies (TSE), which are typically prion diseases, have been identified in both humans and animals. TSEs can be sporadic (spontaneous or classic), familial (genetic/inherited), or acquired (transmitted by exposure to infected tissue). Transmission of the prion has occurred in healthcare-associated CJD during tissue implants or by contaminated neurosurgical instruments. CJD was first identified in 1920; it occurs worldwide with approximately one case per million people per year.

Sporadic CJD (sCJD) is the most common form of human prion disease, accounting for 85% of cases. Diagnosis is made based on clinical symptoms, neuropathological changes, and examination of the molecular features postmortem.

Bovine Spongiform Encephalopathy (BSE) is also known as "mad cow disease" and infects cattle. Ingestion or innoculation of the nervous tissue of these sick animals was found to be the cause in the cases noted in the U.K. and Europe. These human cases are labeled as vCJD and are considered acquired forms of CJD.

Clinical and Pathologic Characteristics Distinguishing Classic CJD from Variant CJD

Characteristic	Classic CJD	Variant CJD
Median age at death	68 years	28 years
Median duration of illness	4-5 months	13-14 months
Clinical signs and symptoms	Dementia; early neurologic signs	Prominent psychiatric/behavioral symptoms; painful dyesthesiasis; delayed neurologic signs
Periodic sharp waves on electroencephalogram	Often present	Often absent
"Pulvinar sign" on MRI	Not reported	Present in >75% of cases
Presence of "florid plaques" on neuropathology	Rare or absent	Present in large numbers

Clinical and Pathologic Characteristics Distinguishing Classic CJD from Variant CJD		
Characteristic	**Classic CJD**	**Variant CJD**
Immunohistochemical analysis of brain tissue	Variable accumulation	Marked accumulation of protease-resistance prion protein
Presence of agent in lymphoid tissue	Not readily detected	Readily detected
Increased glycoform ratio on immunoblot analysis of protease-resistance prion protein	Not reported	Marked accumulation of protease-resistance prion protein
Source: Adapted from Belay E., Schonberger L. Variant Creutzfeldt-Jakob Disease and Bovine Spongiform Encephalopathy. Clin Lab Med 2002;22:849-62.		

Since March 2008, Citrus CHD has investigated one probable and three confirmed cases of sCJD. There has been a lot of interest in this cluster, from local TV requests for information on the cases to subsequent inquiries from the community on the illness.

Course of Events

Citrus County posted its List of Reportable and Communicable Diseases on its internet site in July 2008, when only two of the case investigations had been completed and reported. As a local TV reporter was "looking for a story," he noticed the "spike" in cases. Our only other case since 2000 was reported in 2005, with an event date of December 2002. The reporter contacted the health department. The epidemiology staff gave him information about sporadic CJD and stressed that it is not contagious and is not the same illness as that linked to "mad cow disease." We also gave him resource links for more information. He requested and received copies of the case investigations with the appropriate information redacted. The reporter also contacted Dr. Richard Hopkins for more information.

That evening the report aired and included a few on-camera statements by the CHD's Epidemiologist, Virginia Crandall, R.N., B.S.N., M.P.H. The report concluded with the reporter holding a pound of ground beef and making the statement that the illness was *not* related to eating beef. This picture and statement were also included on the news station's online report.

About ten days later, the following anonymous statement was printed on the editorial page in the local newspaper's "Sounding Off" column: "I am quite concerned about reading that we have two cases of Creutzfeldt-Jacob Disease, which is otherwise known as mad cow disease. I think the state should be investigating these two cases. All of Florida only had one case of the disease, and that was near Miami, in 50 years. And now we have two here? Now come on, this has to be investigated. This is a medical emergency."

At this point, one additional case had just been confirmed and another probable case was being investigated. CHD leadership, Public Information Officer (PIO), and Epidemiology staff were concerned about the media and community's misperceptions, both that there was a public health concern and that it was not being investigated. All agreed that transparency, education, and reassurance were very important. A meeting was held; those in attendance included Roger Sanderson, CHD Epidemiology staff, nursing supervisors, CHD administrators and the PIO, and the regional PIO. Roger gave background and overview information regarding CJD illness and the CJD cases in Citrus County. He provided us with talking points to assist in clearing up the

media, community, and provider confusion regarding the difference in the two illnesses. It was decided that CHD staff would contact the TV reporter, notify him of the new cases, and suggest he discuss these cases with Roger.

The TV reporter did a follow-up story that included an on-camera interview with Roger and an online story. The CHD received four follow-up calls from the community; most were residents who were just curious about the illness and what testing and investigation had taken place, and one was from a parent concerned about an ill child.

During this time, CHD staff were reminded that what we think is 'newsworthy' doesn't always match what non-public health people think is newsworthy. After the last two cases were identified, outreach efforts to the media helped to increase the trust between the CHD and the media and have hopefully served to reassure the community regarding investigation activities. Citrus CHD staff thanks Dr. Richard Hopkins, Dr. Lauren Ball, Roger Sanderson, and Steve Huard, Regional PIO, for their advice and support.

According to Roger Sanderson, "Clusters of sporadic CJD happen and have never been linked to any event/food, etc. It should be remembered that the etiology of sporadic CJD is unknown. The best evidence suggests that sporadic CJD is due to an age-related somatic mutation of the prion protein or a spontaneous conversion of the prion protein from the normal form to the pathogenic form. The use of the term incubation period is not appropriate when talking about sporadic CJD."

More information on CJD can be found at: http://www.cjdsurveillance.com/index.html and http://www.cdc.gov/ncidod/dvrd/cjd/. Both sites and Roger Sanderson were resources for this report.

Profile of Cases

	Age Race Sex	Born	Resident of Citrus Co, FL	Onset of symptoms to death	Interesting notes
Confirmed Case	65 yrs W/F	Ohio	10 yrs	3 months	Snowbird in both Canada and Ohio
Confirmed Case	67 yrs W/F	Ohio	4 yrs	2½ months	
Confirmed Case	81 yrs B/F	Jamaica	10 yrs	2½ months	
Probable Case	77 yrs W/M	Michigan	10 yrs	1½ months	Symptoms and tests consistent with sCJD; CSF testing indicated elevated levels of 14-3-3 protein. No postmortem testing done.
The cases lived in four different zip codes; two were in the same city. None lived within five miles of each other. None lived anywhere else in FL.					

Virginia Crandall is the Assistant Community Health Nursing Director with the Citrus County Health Department.

Listeriosis in a Newborn

Holli Tietjen, M.S., Barbara F. Johnson, R.N., B.S.N., and Judith Cobb, R.N., M.S.P.H.

On October 27, 2008 the Palm Beach County Health Department's Epidemiology and Disease Control Program was notified by a local hospital's infection control of a positive blood culture for *Listeria monocytogenes* in a three-day-old infant. The ill baby along with her twin was born three weeks early via caesarean section. Because the babies were born early, per protocol, a "blood screen" was conducted. Both the mother and the well twin cultured negative for *Listeria*. Upon further investigation, it was found that on October 3 the mother developed a stuffy nose and cold-like symptoms. On October 8, she developed a low-grade fever and her doctor put her on azythromicin. The mother stated that her fever never really went away until after she delivered. The ill baby was born with poor tone and poor respiratory effort, and was intubated. The baby had a scattered exanthem on her torso and extremities, and was placed on ampicillin, gentamicin, and acyclovir. The baby started to improve and upon the last update, she was clear of infection. She was discharged from the hospital on November 16.

Upon interview with the mother, it was found that during the month prior to onset she consumed one Italian deli sandwich from an establishment, some boiled shrimp from another establishment, and a lot of fresh salads and raw vegetables throughout the pregnancy. During the month prior to onset, the mother did not consume any hotdogs, soft cheeses, unpasteurized products, or refrigerated smoked seafood. On October 31, the Florida Department of Agriculture tested 13 samples from the Italian deli/market where six of the family members ate approximately one month earlier. All samples tested negative for *Listeria*.

Commentary

Listeriosis is a bacterial disease that usually presents as either meningoencephalitis and/or septicemia in newborns and adults, or fever and abortion in pregnant women. Infected pregnant women can transmit the bacteria to the fetus either in utero or during passage through the birth canal. Infants may be stillborn, born with septicemia, or develop meningitis in the neonatal period. This can occur even if the mother is asymptomatic at delivery. The case-fatality rate in newborns is 30%, but this approaches 50% when the onset occurs in the first four days. The specific treatment for listeriosis is ampicillin or penicillin alone or, in acutely ill patients, together with aminoglycosides.

Each year in the United States, an estimated 2,500 people become seriously ill with listeriosis, one-third of these during pregnancy. There are an estimated 500 deaths. From 1999 until 2008, there were 331 total cases of listeriosis reported in Florida; 74 in Palm Beach County. Of the 331 cases in Florida during this ten-year period, the least affected age group was five to nine year olds with only two cases; whereas the most affected age group was the 60+ age group with 243 cases. The number of cases in Palm Beach County each year ranged from four to 11.

Holli Tietjen is a Human Services Program Consultant I, Barbara F. Johnson is a Senior Community Health Nursing Supervisor and Judith Cobb is a Community Health Nursing Consultant in the Epidemiology and Disease Control Program at the Palm Beach County Health Department.

Pertussis in an Unvaccinated Cohort in Clay County

Karen Scoggins, M.P.H., C.H.E.S.; Connie Wolfe, R.N., B.S.N.

Synopsis

The Clay County Health Department (CCHD) received a report from a parent on October 14, 2008 that four of her five children had pertussis. The children were seen by the family pediatrician on October 8. The symptomatic children were ages ten months, and three, five, and seven years old. The onsets of cough ranged from September 8 through September 29. Symptoms included persistent cough (4), paroxysmal cough (4), whoop (2), posttussive vomiting (3), stridor (2), and facial flushing (4). All five children in the family were treated with azithromycin and were tested by PCR, which was collected on October 8. Two of the tests were positive, one negative, and one indeterminate. The asymptomatic child also had a positive PCR from that office visit. All five children are home schooled and had not received any vaccinations. The mother also did not have a history of any vaccinations.

Epidemiological Investigation

The parents were interviewed. There were eight total close contacts. On October 14, the three family contacts, which included the parents and the asymptomatic child, were started on antibiotic post-exposure prophylaxis. The remaining five contacts were neighborhood children whom the case children played with for several hours multiple times each week. The playmates all received post-exposure prophylaxis through their private physicians.

It is unknown how the first child was exposed. Although the northeast Florida area has seen an increase in pertussis cases, there were no other reports of close contacts to the child that had history of cough. As of October 29, the asymptomatic child and all of the other contacts had not developed symptoms. The mother declined any vaccinations for herself or her children at the time. Information regarding vaccines benefits and possible side effects was discussed with the mother.

The CCHD took the opportunity to send out a press release regarding the identification of pertussis in our county. This press release also included CDC recommendations for the TDap vaccine and website links were provided for people to review information about the disease and the vaccines available. Certain businesses such as the local hospital and the CCHD also encouraged their employees to get the TDap vaccine.

Background

Review of Merlin reporting data for the northeast Florida counties of Alachua, Clay, Duval, Flagler, Nassau, St. Johns, and Union counties, revealed an increase in reported pertussis cases during January 1-December 1, 2008. The number of confirmed and probable cases reported was 82 as compared to 14 for the same time period during 2007. The northeast Florida counties of Baker, Bradford, and Putnam did not have any reported cases of pertussis during that time frame in 2008 or 2007.

Educational Materials

1. CDC Guidelines for the Control of Pertussis Outbreaks
   http://www.cdc.gov/vaccines/pubs/pertussis-guide/guide.htm
2. Vaccine Information Statement for Tdap/Td Vaccine
   http://www.cdc.gov/vaccines/pubs/vis/downloads/vis-td-tdap.pdf

Karen Scoggins is a biological scientist and Connie Wolfe is a Senior Community Health Nursing Supervisor with the Clay County Health Department.

Florida Year-to-Date Mosquito-Borne Disease Summary Through December 12, 2008

Kristina Weis, Ph.D., Caroline Collins, Danielle Stanek, D.V.M., Carina Blackmore, D.V.M, Ph.D.

During the period from January 1 through December 12, 2008, the following arboviral activity was recorded in Florida: Eastern equine encephalitis virus (EEEV), West Nile virus (WNV), St. Louis encephalitis virus (SLEV), Highlands J virus (HJV), and California encephalitis group viruses (CEV).

EEEV Activity

A locally acquired EEE case was confirmed in a Leon County resident in August. Positive samples from 126 sentinel chickens, 86 equines, two other mammals, three dead birds, and 93 live wild birds were received from 38 counties. EEEV was cultured from a pool of 50 *Culex salinarius* and a pool of 50 *Cx. nigripalpus*, both collected on February 13 in Volusia County, and one pool of 50 *Culiseta melanura* collected on March 19 in Flagler County.

WNV/SLEV Activity

Two locally acquired WNV neuroinvasive disease cases were confirmed in Escambia County residents in September. A Wakulla County resident was also found to have WNV disease, though it is likely that the infection was acquired out-of-state. Positive samples of WNV antibody from 20 sentinel chickens and one horse were received from 13 counties. Flavivirus-reactive samples from three live wild birds were received from Hillsborough, Okaloosa, and Santa Rosa counties. It was not determined whether the wild bird samples were reactive specifically to SLEV or WNV.

HJV activity

Positive samples from 58 sentinel chickens were received from 15 counties. HJV was isolated from three pools of 50 *Culex nigripalpus* collected on February 22, February 26, and March 28 in Volusia County and two pools of *Cs. melanura* collected on March 19 and May 7 in Flagler County.

CEV activity

LaCrosse encephalitis was confirmed in a Hillsborough County resident with travel history to North Carolina. This case was reported as a Florida case acquired out-of-state. La Crosse virus is in the California encephalitis group of viruses. California serogroup virus was isolated from a pool of *An. crucians* collected on July 16 in Santa Rosa County.

Dead Bird Reports

The Fish and Wildlife Conservation Commission (FWC) collects reports of dead birds, which can be an indication of arbovirus circulation in an area. Since January 1st, 536 reports representing a total of 1,270 dead birds (53 crows, 62 jays, 72 raptors, and 1,083 others) were received from 57 of Florida's 67 counties.

Please note that FWC collects reports of birds that have died from a variety of causes, not only arboviruses. Dead birds should be reported to www.myfwc.com/bird/.

See the following web site for more information: http://www.doh.state.fl.us/environment/community/arboviral/index.html. Also, the Disease Outbreak Information Hotline offers recorded updates on medical alert status and surveillance at **888.880.5782.**

At press time, the Arthropod-borne Disease Surveillance Coordinator position is vacant. Dr. Weis, is the CDC/CSTE Applied Epidemiology Fellow with the Bureau of Environmental Public Health Medicine. Dr. Stanek is a medical epidemiologist with the Bureau of Environmental Public Health Medicine. Dr. Blackmore is the State Public Health Veterinarian and the Chief of the Bureau of Environmental Public Health Medicine which is within the Division of Environmental Health, DOH.

64D-3 *F.A.C.* Revisions

Janet J Hamilton, M.P.H.

The Department of Health (DOH) is pleased to announce the completion of a rewrite of Chapter 64D-3, *Florida Administrative Code (F.A.C.)*, which governs disease reporting. Notifiable disease or condition surveillance is a core public health function codified in state law, *Florida Statute* 381.0031. *Florida Statute* 381.0031 states that any practitioner licensed in Florida to practice medicine, osteopathic medicine, chiropractic medicine, naturopathy, or veterinary medicine; any hospital or any laboratory that diagnoses or suspects the existence of a disease of public health significance shall report the information to the DOH. This statute also states that periodically DOH shall issue rules and a list of infectious or noninfectious diseases determined to be a threat to public health. *F.A.C.* 64D-3 is a rule adopted by DOH related to reporting diseases of significance to public health, which specifies what diseases or conditions are required to be reported, the information to be included in the report, who is required to report, and the methods and time period for reporting necessary to protect the health of all Floridians and visitors to the state.

The updated version of Chapter 64D-3, *F.A.C.*, became effective **November 24, 2008**. A very extensive rewrite of Chapter 64D-3 occurred in November 2006. The extensive rewrite in 2006 was to update and streamline the rule language in particular to reduce redundancy and to clarify reporting and testing requirements for healthcare providers, laboratories, hospitals, and other entities. The 2008 updates to Chapter 64D-3 were primarily to amend the list of reportable diseases and conditions, add additional clarity to several reporting requirements, and incorporate feedback received after the extensive 2006 revision**.** To find the updated guidelines for reporting and other important disease reporting documents, log onto:
http://www.doh.state.fl.us/disease_ctrl/epi/topics/surv.htm

Below is a summary of the amendments to Chapter 64D-3 which became effective November 24, 2008:

- The following four diseases or conditions were added to the list of reportable diseases or conditions: 1) Amebic encephalitis, 2) Arsenic poisoning, 3) *Staphylococcus aureus*-community associated mortality, 4) *Staphylococcus aureus* isolated from a normally sterile site. *Staphylococcus aureus* isolated from a normally sterile site is to be reported only by those laboratories participating in DOH's electronic laboratory reporting process.
- One disease was deleted from the list of notifiable diseases or conditions: disease due to *Clostridium perfringens epsilon* intoxication.
- The definition of an outbreak was updated: An outbreak is defined as an increase in the number of cases of a disease or condition compared to the expected number in a particular period of time and geographical area. For diseases where the expected number is zero, a single case constitutes an outbreak.
- Added the definition of urgent public health significance: A characteristic of a disease or condition that requires rapid public health response due to the: potential to cause significant morbidity or mortality; potential for infectiousness between humans or spread to humans; and the number of cases.

- Additional language was added to the "Table of Notifiable Diseases or Conditions to be Reported" to clearly specify that any single case of a disease or condition found in the community or defined setting such as a hospital, school, or other institution that is of urgent public health significance should be reported even if the disease or condition is not specifically listed in Chapter 64D-3.
- Text related to other diseases or conditions was modified to improve reporting clarity and include: erlichiosis/anaplasmosis, herpes simplex virus (HSV) in infants up to six months of age with disseminated infection with involvement of liver, encephalitis, and infections limited to skin, eyes, and mouth; human immunodeficiency virus (HIV) exposed newborn-infant less than 18 months of age born to a HIV-infected woman; human papilliomavirus-(HPV) associated laryngeal papillomas or recurrent respiratory papillomatosis in children less than six years of age; HPV cancer-associated strains; lead poisoning; and poliomyelitis.

If there are any questions about reporting requirements or changes to 64D-3 *F.A.C.*, please contact your county health department or the Bureau of Epidemiology at 850-245-4401.

The Department of Health looks forward to continued partnership with the healthcare community to protect the health of Floridians.

Janet J Hamilton is the Surveillance Section Administrator in the Bureau of Epidemiology, Florida Department of Health.

Florida Influenza Surveillance Report

Kateesha McConnell, M.P.H.

Influenza surveillance in Florida consists of seven surveillance components: 1) Florida Sentinel Provider Influenza Surveillance Network (FSPISN); 2) Florida Pneumonia and Influenza Mortality Surveillance System; 3) State laboratory viral surveillance; 4) County influenza activity levels; 5) Notifiable Disease Reports 6) Influenza or influenza-like illness (ILI) outbreaks and 7) Syndromic Surveillance.

Syndromic surveillance ILI data, as monitored through the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE), is a newly added component of the overall state influenza surveillance program. Each week, a graph of the percentage of ILI visits to participating emergency departments will be available in the weekly influenza surveillance report. This added information will provide an additional source of data to monitor ILI activity in the state.

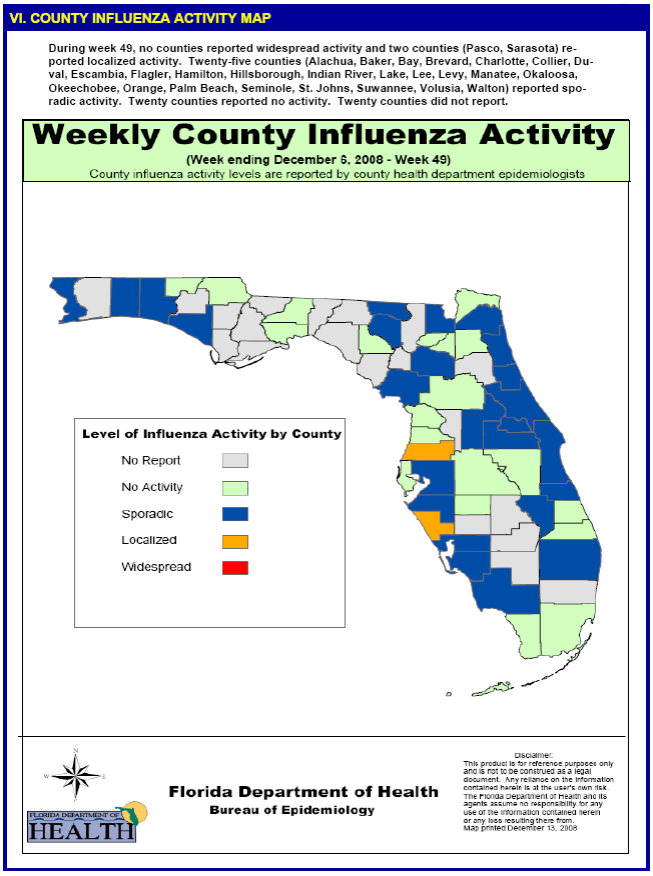
For the most up to date information regarding influenza surveillance and the progress of the influenza season in Florida, please visit the Bureau of Epidemiology influenza surveillance reports website at:
http://www.doh.state.fl.us/disease_ctrl/epi/htopics/flu/reports.htm.

During weeks 45-49 of the 2008-2009 influenza season, statewide influenza activity was reported as sporadic according to the national CDC influenza activity criteria. The proportion of patient visits for ILI as reported by the FSPISN averaged 1.18% for these five weeks, which is below the state threshold for moderate activity of 2.98%. There have been no ILI outbreaks noted in Florida so far this season. Influenza activity across the nation has also been low during this same time period. Most of the viruses characterized this season have been related to the strains found in

the 2008-2009 vaccine. However, antiviral resistant influenza A (H1N1) viruses have been detected in a small number of samples submitted by various states and analyzed by the CDC laboratory. For more information please visit:
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5749a3.htm

The Florida Bureau of Laboratories has tested a total of 105 specimens for influenza viruses since September 28, 2008. Seventeen of the specimens have tested positive for influenza. They include five influenza A H1, one influenza A, and 11 influenza B. Although influenza A is typically more commonly isolated than influenza B, so far this season influenza B has been the predominant type isolated. During week 49, no counties reported widespread activity and two counties reported localized activity. Twenty-five counties reported sporadic activity and 20 counties reported no activity. Twenty counties did not report.

Overall, the flu season in Florida is progressing normally. Thank you to all of our surveillance partners for their continuous surveillance efforts around the state, which enables us to accurately monitor influenza activity in the state. Remember, now during the holiday season is an excellent time to protect yourself and your family from the flu - get your flu shot today!



Kateesha A. McConnell is the respiratory disease surveillance epidemiologist in the Bureau of Epidemiology.

Recently Published

"Potential Effects of Electronic Laboratory Reporting on Improving Timeliness of Infectious Disease Notification --- Florida, 2002--2006"
A Kite-Powell, M.S., JJ Hamilton, M.P.H., RS Hopkins, M.D., Florida Dept of Health. JM DePasquale, M.D., EIS Officer, CDC.
MMWR, December 12, 2008/57(49);1325-1328

"Outbreak of Legionellosis Associated with Exposure to a Hotel Outdoor Hot Tub, Orange County, Florida, March 2008."
L Eisenstein, M.P.H. and D Bodager, R.S., DAAS, M.P.A., Florida Dept of Health.
Florida Journal of Environmental Health, Fall 2008

"Self-rated depression and physician-diagnosed depression and anxiety in Florida adults: Behavioral Risk Factor Surveillance System"
Fan AZ, Strine TW, Huang Y, Murray MR, Musingo S, Jiles R, et al.
Prev Chronic Dis 2009; 6(1).

Upcoming Events

Epidemiology and Rash Illness Outbreak Tactics: Combining Epidemiologic Practice with Field Operations

The Bureau of Epidemiology will host a series of four regional trainings that will focus on operationalizing surveillance, outbreak investigation, and public health response skills in containing an outbreak that has exceeded the local resources. The training will involve short lectures and small group table top exercises. The training is open to all epidemiology staff and epidemiology strike team members.

The four regional training dates and locations are: January 14, Betty Easley Conference Center, Tallahassee; February 11, Jacksonville Central Laboratory, Jacksonville; March 13, Orange County Health Department, Orlando; and March 31, Palm Beach County Health Department, Palm Beach. To register and for more information see: http://www.doh.state.fl.us/disease_ctrl/epi/conf/training/Regional_Epi_Training.html or contact Charlotte White at 850.245.4444 Ext. 3675.

Bureau of Epidemiology Monthly Grand Rounds
Date: Last Tuesday of each month
Time: 10 a.m.-11 a.m.
Location: Building 2585, Room 310A
Dial-In Number: 877.646.8762 (password: Grand Rounds)

Upcoming Topics:

January	"Epidemiology and Environmental Health Strike Team Exercise Overview," presented by Lauren Ball, D.O., M.P.H.
February	"Viral Hepatitis Profile of Seminole County and Comparison of 09 Program Accomplishments with Unfunded Surrounding Counties," presented by Racquel Stephenson, M.P.H., FL-EIS Fellow in Seminole County.

Reportable Diseases in Florida

Up-to-date information about the occurrence of reportable diseases in Florida, based on the Merlin surveillance information system, is available at the following site: http://www.floridacharts.com/merlin/freqrpt.asp. Counts can be displayed by disease, diagnosis status, county, age group, gender, or time period.

Monthly Notifiable Disease Data

Table 1. Provisional Cases* of Selected Notifiable Diseases, Florida, November 1-30, 2008

	Month				Cumulative (YTD)	
Disease Category	**2008**	**2007**	**Mean†**	**Median¶**	**2008**	**2007**
A. Vaccine Preventable Diseases						
Diphtheria	0	0	0	0	0	0
Measles	0	0	0.2	1	0	5
Mumps	2	0	1.0	1	26	17
Pertussis	28	11	8.4	10	272	203
Poliomyelitis	0	0	0	0	0	0
Rubella	0	0	0	0	3	0
Smallpox	0	0	0	0	0	0
Tetanus	0	1	0.6	1	1	5
Varicella	122	138	29.6	74	1,517	1,177
B. CNS Diseases & Bacteremias						
Creutzfeldt-Jakob Disease	1	0	1.0	2	27	11
H. Influenzae (invasive)	18	8	7.4	2	134	105
in those ≤5	3	5	4.4	4	54	63
Listeriosis	6	2	4.8	4	44	24
Meningitis (bacterial, cryptococcal, mycotic)	16	9	12.2	14	181	121
Meningococcal Disease	2	4	4.4	4	52	61
Staphylococcus aureus (VISA, VRSA)	2	0	0	0	3	0
Streptococcal Disease, Group A, Invasive	28	29	20.8	19	254	292
Streptococcus pneumoniae (invasive disease)						
Drug resistant	74	63	47.4	53	667	654
Drug susceptible	45	59	40.6	38	587	555
C. Enteric Infections						
Campylobacteriosis	72	67	68.6	68	1,023	941
Cholera	0	0	0	0	1	0
Cryptosporidiosis	42	66	50.6	53	498	699
Cyclospora	1	0	1.8	9	56	32
Escherichia coli, Shiga-toxin producing (STEC)**	11	5	4.8	3	46	35
Giardiasis	148	105	97.2	105	1,225	1,186
Hemolytic Uremic Syndrome	1	0	0.4	1	4	6
Salmonellosis	516	595	534.2	506	4,823	4,550
Shigellosis	53	87	135.8	158	755	2,063
Typhoid Fever	0	1	1.2	3	14	13
D. Viral Hepatitis						
Hepatitis A	5	11	18.8	16	153	156
Hepatitis B, Acute	21	22	38.0	40	326	342
Hepatitis C, Acute	0	2	3.4	4	51	45
Hepatitis +HBsAg in pregnant women	35	57	47.8	49	544	569
Hepatitis D, E, G	0	0	0	0	1	2

* Confirmed and probable cases based on date of report as reported in Merlin
Incidence data for 2008 is provisional, data for 2007 are finalized

† Mean of the same month in the previous five years

¶ Median for the same month in the previous five years

** Includes *E. coli* O157:H7; shiga-toxin positive, serogroup non-O157; and shiga-toxin positive, not serogrouped

†† Includes neuroinvasive and non-neuroinvasive

N/A indicates that no historical data is available to caculate mean and median

Table 1. (cont.) Provisional Cases* of Selected Notifiable Diseases, Florida, November 1-30, 2008

	Month				Cumulative (YTD)	
Disease Category	**2008**	**2007**	**Mean†**	**Median¶**	**2008**	**2007**
F. Vector Borne, Zoonoses						
Dengue	2	5	2.2	2	30	39
Eastern Equine Encephalitits††	0	0	0	0	1	0
Ehrlichiosis/Anaplasmosis	2	2	0.8	1	13	19
Leptospirosis	0	0	0	0	0	0
Lyme Disease	17	3	4.2	3	133	27
Malaria	7	1	7.2	6	56	50
Plague	0	0	0	0	0	0
Psittacosis	0	0	0	0	4	0
Q Fever (acute and chronic)	1	0	0.4	2	1	2
Rabies, Animal	11	8	10.6	9	138	123
Rabies (possible exposure)	125	182	101.8	99	1,464	1,341
Rocky Mountain Spotted Fever	3	1	1.6	2	19	15
St. Louis Encephalitis††	0	0	0	0	0	0
Toxoplasmosis	1	1	1.4	2	15	5
Trichinellosis	0	0	0	0	1	0
Tularemia	0	0	0.2	1	0	0
Typhus Fever (epidemic and endemic)	0	0	0	0	0	1
Venezuelan Equine Enchephalitis††	0	0	0	0	0	0
West Nile Virus††	0	0	2.6	7	4	3
Western Equine Encephalitis††	0	0	0	0	0	0
Yellow Fever	0	0	0	0	0	0
G. Others						
Anthrax	0	0	0	0	0	0
Botulism-Foodborne	0	0	0.2	0	0	0
Botulism-Infant	0	0	0.2	1	1	1
Brucellosis	1	1	0.4	1	11	8
Glanders	0	0	0	0	0	0
Hansen's Disease (Leprosy)	2	3	0.6	3	11	9
Hantavirus Infection	0	0	0	0	0	0
Legionella	14	10	10.8	10	139	133
Melioidosis	0	0	0.2	1	0	0
Vibriosis	4	9	9.6	9	89	93

* Confirmed and probable cases based on date of report as reported in Merlin
Incidence data for 2008 is provisional, data for 2007 are finalized

† Mean of the same month in the previous five years

¶ Median for the same month in the previous five years

†† Includes neuroinvasive and non-neuroinvasive

N/A indicates that no historical data is available to caculate mean and median

Note: The 2008 case counts are provisional and are subject to change until the database closes. Cases may be deleted, added, or have their case classification changed based on new information and therefore the monthly tables should not be added to obtain a year to date number.

Please refer any questions regarding the data presented in these tables to Kate Goodin at Kate_Goodin@doh.state.fl.us or 850.245.4444 Ext. 2440.

This Month on EpiCom

Christie Luce

EpiCom is located within the Florida Department of Health's Emergency Notification System (FDENS). The Bureau of Epidemiology encourages *Epi Update* readers not only to register on the EpiCom system by emailing the Florida Department of Health Emergency Notification System Helpdesk at FDENS-help@doh.state.fl.us, but to sign up for features such as automatic notification of certain events. Users are invited to contribute appropriate public health observations related to any suspicious or unusual occurrences or circumstances through the system. EpiCom is the primary method of communication between the Bureau of Epidemiology and other state medical agencies during emergency situations. Following are selected recent postings:

- GI illness in an assisted living facility, Alachua County
- Occupational lead poisoning, Palm Beach County
- GI illness in an assisted living facility, Collier County
- GI cluster, Pinellas County
- Suspected foodborne outbreak associated with a Thanksgiving holiday dinner, Broward County
- School varicella outbreaks, Pasco County
- Suspected foodborne outbreak linked to events at a local private school, Lake County
- Varicella outbreak in high school students, Volusia County
- GI illness outbeaks in long term care facilities, Sarasota County
- Possible *N. meningitidis*, Santa Rosa County
- GI illness outbreak at two long-term care facilities, Charlotte County

Christie Luce is the Surveillance Systems Administrator for Bureau of Epidemiology.

Epi Update *is the peer-reviewed journal of the Florida Department of Health, Bureau of Epidemiology, and is published monthly on the Internet. Current and past issues of Epi Update are available online: http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/index.html. The current issue of Epi Update is available online: http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2008/DecemberEpiUpdate.pdf. For submission guidelines or questions regarding Epi Update, please contact Leesa Gibson at Leesa_Gibson@doh.state.fl.us.*