Epi Update

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*"The reason for collecting, analyzing and disseminating information on a disease is to control that disease. Collection and analysis should not be allowed to consume resources if action does not follow."*

Foege WH., International Journal of Epidemiology 1976; 5:29-37

### In This Issue



## Commentary from the State Epidemiologist

***Richard S. Hopkins, M.D., M.S.P.H.***

How does organized community effort prevent infectious disease cases in people? There are a good many strategies, but not as many as there are different infectious diseases that threaten the public's health. Fortunately, there are some general approaches that can be applied to many different diseases, and experience gained in the control of one disease is often transferable to others.

Infectious disease prevention and control programs may have some or all of these components: surveillance, laboratory testing, environmental controls, vaccination, treatment of cases, identification of contacts, post-exposure treatment or vaccination of contacts, isolation of cases, quarantine of contacts, other limitations on the freedom of movement or activities of cases or contacts, provider education and training, and general public education. We will be talking about all of these over the next couple of months.

Infections may come either from other humans or from non-human sources. Eradicating or reducing the amount of an infectious agent in the environment, or putting suitable barriers between the infectious agent and people are very satisfying strategies, and are often very effective. One of the reasons for their effectiveness is that usually once the strategies are in effect, people no longer have to remember to take specific actions to avoid infection. For example, provision of safe drinking water and milk means that people do not have to boil or disinfect their drinking water, or pasteurize their own milk. Many of the effective measures that protect the public from infectious diseases are actually integrated into the work of other agencies – for example seafood and most other food safety (including eggs, poultry and meat) in the

Department of Agriculture and Consumer Services, restaurant inspection and regulation (mostly) in the Department of Business and Professional regulation, drinking water regulation in the Department of Environmental Protection (with the participation of selected County Health Departments), and inspection and regulation of healthcare facilities in the Agency for Health Care Administration. None of those other agencies has the responsibility that the Department of Health has, however, to monitor human health, detect cases and outbreaks of infectious diseases, determine the causes of those outbreaks or ongoing infection problems, and make recommendations or requirements for control measures to stop outbreaks and prevent their recurrence.

Some environmental strategies to prevent human infections do require active participation by citizens – for example, reducing or eliminating mosquito-breeding sites (the object of very active efforts currently in Key West to eradicate local transmission of dengue). Other strategies include food safety in the home kitchen (making sure that raw poultry does not contaminate foods that will be eaten without cooking), avoidance of uncooked or undercooked oysters by people with liver or immune system diseases to avoid severe Vibrio infections, or avoidance of certain foods while traveling in resource-poor countries. These require never-ending education efforts, often starting in school.

Therefore, most environmental health activities in infectious disease are designed to reduce or eliminate human exposures to the infectious agents. Another strategy is to vaccinate people to assure that they are already immune to the agent before they are exposed, and illness does not result. Our eradication of smallpox from the world, and of polio from the Western Hemisphere, together with tremendous reductions of case rates for measles, rubella, mumps, diphtheria, and tetanus are well-known success stories. Less well known is the essential eradication by a vaccine of meningitis and septicemia due to *Hemophilus influenzae* type b, which as recently as 20 years ago was a major cause of severe illness, disability, and death in young children. Also, the 50% reduction in the last 10 years in cases of meningococcal disease; comparable or larger reductions in new cases of hepatitis A and B due to widespread vaccine use, including large reductions in congenital hepatitis B infection. There are recent dramatic reductions in physician visits and hospitalizations due to rotavirus thanks to widespread use of the vaccine for that disease. Pertussis, while much reduced compared to the pre-vaccine era, is proving to be more difficult to bring close to eradication.

For some diseases, post-exposure vaccination of unvaccinated contacts is a mainstay of our control efforts – this includes measles and hepatitis B, as well as pertussis. For diseases with moderately long incubation periods, vaccination right after exposure to the wild disease agent can result in enough protective antibodies soon enough to make the disease much milder than it would otherwise be, and even prevent clinical illness.

For the childhood vaccine-preventable diseases, vaccinating children both protects the children themselves and protects all the other children in the community – for example, those with medical contraindications to vaccination, or who are too young to be vaccinated. This discussion, as well as a discussion on the strategy of identifying and treating contacts to cases of infectious diseases, will continue next month.

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# Suspect Norovirus Outbreak Linked To a Seafood Festival, Brevard County, February 2011

***Dean Bodager, R.S., D.A.A.S., M.P.A, George Jackow, B.A, M.A***

INTRODUCTION

On February 28, 2011, the Brevard County Health Department (CHD) was notified by a resident that he had a gastrointestinal illness that he suspected might be linked to the consumption of food at a local seafood festival that took place February 26 and 27 in southern Brevard County. A complete three-day food history was completed by the Brevard CHD and logged for additional surveillance. Three days later a second caller reported that there were six ill individuals in a group of 25 who also had attended the same local seafood festival.

On March 3, a third person contacted the CHD with similar symptoms and exposures. The three ill complainants' incubation periods ranged from 34-44 hours with reported symptoms of nausea, vomiting, diarrhea, abdominal cramps, headache, chills, weakness, fatigue, and sweating. Duration of the illness ranged from 12 hours to 4 days. The three cases resided in Brevard County, South Florida, and New York. An item was posted on EpiCom on March 3, 2011 to alert other CHDs and health care providers of the outbreak.

METHODS

The Brevard County foodborne-illness complaint log was reviewed for persons who exhibited any symptoms of vomiting or diarrhea and who attended or consumed food at the seafood festival prior to illness onset. A case was defined as a person who experienced diarrhea or vomiting subsequent to consuming food at the seafood festival in Grant, Florida on February 26 or 27, 2011. The second complainant did not provide names and contact information of the other ill persons and the cohort of 25. Interviews of well and ill persons were completed for persons who elected to contact the health department team at the request of the other two complainants. Interviews were performed using the standard foodborne and waterborne disease surveillance form (1). No food products were available for laboratory analysis. Stool samples were not provided for analysis.

As required by Florida law, the Grant Seafood Festival registered as a temporary event with the Brevard CHD and was inspected prior to the event by environmental health staff on February 26, 2011. Brevard CHD's Environmental Public Health Services reviews all temporary food service events at facilities under the jurisdiction of the Florida Department of Health within Brevard County. Each facility that requests to have a temporary event where food is served completes a sponsor and booth notification form for every food or drink booth planned for the event and submits documentation to the environmental public health office with applicable fees at least three days prior to the event. The CHD then reviews the information, addresses any concerns with the sponsor, and provides the sponsor with a *Food Safety at Temporary Events* brochure. Sponsors planning to serve potentially hazardous foods are inspected at least one time during the event to ensure that proper food handling techniques are followed and that standards set forth in Chapter 64E-11, Florida Administrative Code (F.A.C.) are met. Depending on the size of the event, a set-up/preliminary inspection may be conducted prior to the beginning of the event (typically the day before the event begins). Information on menu items, vendors, event layout schematic, and contact persons was already available to the investigation team for analysis because of this registration process. The event organizer was contacted to determine the source(s) of the food products served at the event.

RESULTS

Ten people contacted the Brevard CHD to be interviewed between March 2 and 9 including the three original complainants. Well persons who consented to be interviewed attended the fair with the interviewed ill persons. Seven persons described illness that matched the case definition. Reported illness onsets ranged from February 27 at 8:00 am to February 28 at 8:00 am. Chart 1 depicts the reported illness onsets by twelve-hour intervals. Five of the ill persons were male. Predominant symptoms described were diarrhea, vomiting, nausea, fatigue, and chills. Table 1 illustrates the symptoms in detail. The incubation period of the ill persons ranges from 21-44 hours with a median of 34.5 hours. Duration of the illnesses described by six ill persons ranged from 12 to 96 hours with a median of 18.5 hours. The age of the ill persons ranged from 53 to 67 years with a median of 62 years. No other similar illnesses outside of these seven were reported to Brevard CHD or any other county health department.

**Chart 1: Gastrointestinal Illness by 12 Hour Onsets**
**Seafood Festival, February, 2011, Brevard County**

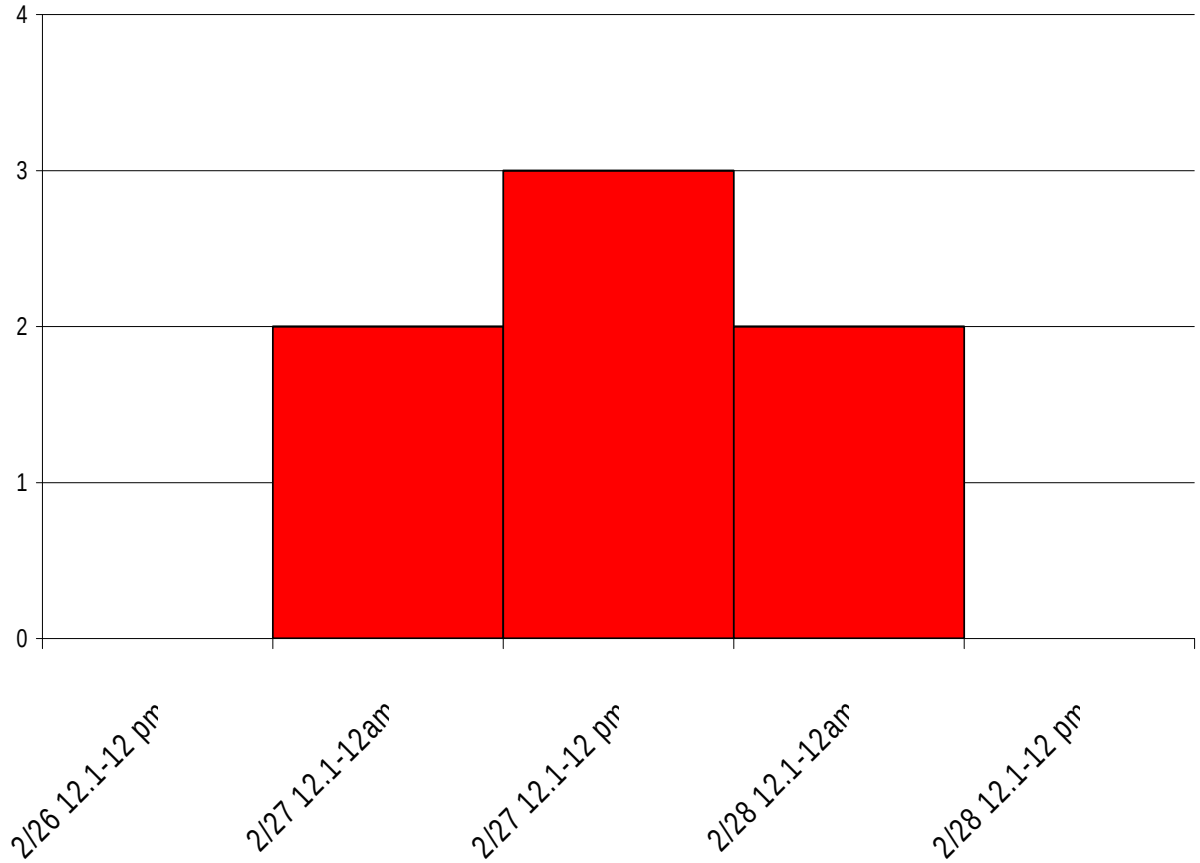

Table 1: Frequency of Symptoms for Illnesses Associated with Seafood Festival, February 2011, Brevard County, FL

| Symptom | Frequency | Percentage of Total Ill (n=7) |
|---|---|---|
| Nausea | 7 | 100 |
| Fatigue | 7 | 100 |
| Chills | 6 | 85.7 |
| Vomiting | 6 | 85.7 |
| Diarrhea | 5 | 71.4 |
| -Watery | 2 | 40.0 |
| -Mucousy | 0 | 0 |
| -Bloody | 0 | 0 |
| Abdominal Cramps | 4 | 57.1 |
| Headache | 4 | 57.1 |
| Fever | 3 | 42.9 |
| Sweating | 1 | 14.2 |
| Joint Pain | 1 | 14.2 |
| Dehydration | 1 | 14.2 |

N=7

Analysis of the exposure data from the interviews conducted indicates that six of seven ill persons and one of the three well persons reported consuming raw oysters. Four of seven ill persons and none of the well persons consumed fried oysters. Three of the ill persons and none of the well persons consumed steamed oysters. Seven of seven ill persons described consuming fried shrimp, as did all three of the well persons.

The event organizer provided invoices and oyster tags. The vendor received 5,800 pounds (145 40-pound bags) of oysters over the two days of the festival. A total of 1,560 pounds of frozen oysters were also received and sold as fried oysters. Ninety of the oyster bags were served raw, shucked onsite, and the rest were served steamed. The raw oysters, harvested on February 20, 2011, were shipped from Aransas Bay, TX, with a sell by date of March 6, 2011. This trace back information was provided to the Department of Agriculture and Consumer Services. Twelve to thirteen people worked as oyster shuckers on the two days of the festival. According to the vendor, no gastrointestinal illness was reported among the shuckers on the days prior to or during the event.

The inspection on February 26, 2011 of all the vendors at the seafood festival by the Brevard CHD environmental health staff revealed that hand sinks at many food stations were lacking hot water. The oyster booth manager reported that the hand washing facility utilized by the oyster shuckers was not within the food station but eighty feet away. Public restroom facilities were provided but not readily available to the food workers. Hot water was not provided at the hand sinks for the public restrooms. There were four hand wash stations without hot water along with two 10-stall public bathroom units, 35 individual portable toilets and five handicap portable toilets. Personal protective gear including rubber aprons and cloth gloves was distributed and used by individuals assigned to the raw oyster concession. People responsible for steaming oysters used rubber gloves in addition to the rubber aprons. The manager of the concession stated that the

oyster shuckers who used cloth gloves removed them prior to entering the bathroom facilities. The temperatures documented at the vendor stations were within acceptable ranges including those for oysters and shrimp.

CONCLUSIONS

This cluster of gastrointestinal illnesses appears to be associated with consuming oysters at the Grant Seafood Festival on February 26, 2011. The onsets of illness are clustered in a 24-hour period indicating a common point source exposure, such as from food or water. The reported signs and symptoms of the illness are consistent with previous reports of gastrointestinal outbreaks caused by the viral agent Norovirus. The median and range of the incubation period are also consistent with that of Norovirus. The observed sanitation practices on February 26 could possibly contribute to the transmission of viral particles, particularly the lack of easily accessible hand washing facilities with hot water. The lack of a hand washing sink with hot water, soap, and drying devices specifically for the oyster vendor could preclude the appropriate hand washing activities needed to reduce the risk for the transmission of viral particles. Although the manager denied similar gastrointestinal illnesses in the food workers for the oyster vendor, it is possible that handling rather than filter feeding where the oysters were harvested contaminated oysters. This is also consistent with the relatively small number of illnesses reported.

The absence of additional reported illnesses could indicate an intermittent contamination scenario, be a result of the passive nature of foodborne disease reporting, or result from the reluctance of the affected community to contact or cooperate with government public health agencies. Limitations to this investigation include a relatively small sample size, lack of cooperation by one of the affected individuals who initially reported the outbreak, and limited food exposure data for well persons.

Norovirus is an enteric virus sustained largely by humans. Once a person is infected, maximum viral shedding occurs 1-3 days later and the virus can be shed in stool up to 2 weeks after onset of symptoms. Volunteer studies have demonstrated that up to 30% of infected persons may be asymptomatic. There is evidence of an infectious period 24 hours prior to illness onset. Noroviruses are highly contagious, and it is thought that an inoculum of as few as 10 viral particles may be sufficient to infect a person.

Noroviruses are transmitted primarily through the fecal-oral route, either by consumption of fecally contaminated food or water or by direct person-to-person contact. Fecal contamination of hands and subsequent lack of hand washing can spread the organism to various surfaces, where it can remain viable for weeks. While many Norovirus outbreaks result from exposure to contaminated food or water, most arise from person to person transmission (3). In restaurant outbreaks, ready-to-eat foods (e.g. salads, sandwiches) have classically posed a greater risk as they are exposed more frequently to bare human hands and are not cooked.

The incubation period for Norovirus-associated gastroenteritis in humans is usually between 24 and 48 hours (median in outbreaks 33 to 36 hours), but cases can occur within 12 hours of exposure. Norovirus infection usually presents as acute onset of vomiting, watery non-bloody diarrhea with abdominal cramps, and nausea. Low-grade fever also occasionally occurs, and vomiting is more common in children. Norovirus symptoms generally remain 24 to 60 hours for most cases. Recovery is usually complete and there is no evidence of any serious long-term sequelae (2).

RECOMMENDATIONS

It is imperative that food service facilities that serve any food products to the public constantly and vigorously promote and insist on proper hand washing procedures by food workers during all phases of food preparation, display, and storage. Proper hand washing procedures must be emphasized and used even when food workers who prepare foods use gloves. This includes maintaining hand washing sinks and providing soap and disposable towels at strategic and easily accessible concession stand locations. Ill food workers must be excluded from food preparation activities. Ensuring properly cleaned and sanitized food contact surfaces and proper temperature controls also contributes to the elimination or reduction of viral particles on fomites or in food products. These procedures and practices can be learned through food safety education courses and regulatory inspections.

Investigation Team: George Jackow, Anthony Makielski, Vern Buchanan, Matthew Borden, Elizabeth Bishop, and Dean Bodager

Sources

(1) Florida Department of Health, Food and Waterborne Disease Program, Foodborne Tri-Agency Survey Form. http://www.myfloridaeh.com/medicine/foodsurveillance/forms/Tri-Agency_Foodborne_Illness_Form_Electronic_2-16-2011.pdf.

(2) CDC Website, http://www.cdc.gov/ncidod/dvrd/revb/gastro/norovirus.htm , Accessed 2/13, 2011.

(3) Doyle TJ, Stark L, Hammond R, Hopkins RS. Outbreaks of noroviral gastroenteritis in Florida, 2006-2007. Epidemiol. Infect. 2008; 23:1-9.

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# Cysticercosis: An Emerging Parasitic Disease with Implications for Introduction into Non-Endemic Regions: Case Example from Pasco County Health Department

***Tara A. Richardson, M.P.H and Garik A. Nicholson, M.P.H***

Introduction

On September 16, 2010, the Pasco County Health Department (PCHD) Epidemiology Program was notified by the Regional Food and Waterborne Epidemiologist and the Hillsborough County Health Department (CHD) Epidemiology Department of a 5-year-old Haitian-American boy diagnosed with neurocysticercosis and possible exposure to other household members with taeniasis.

Background

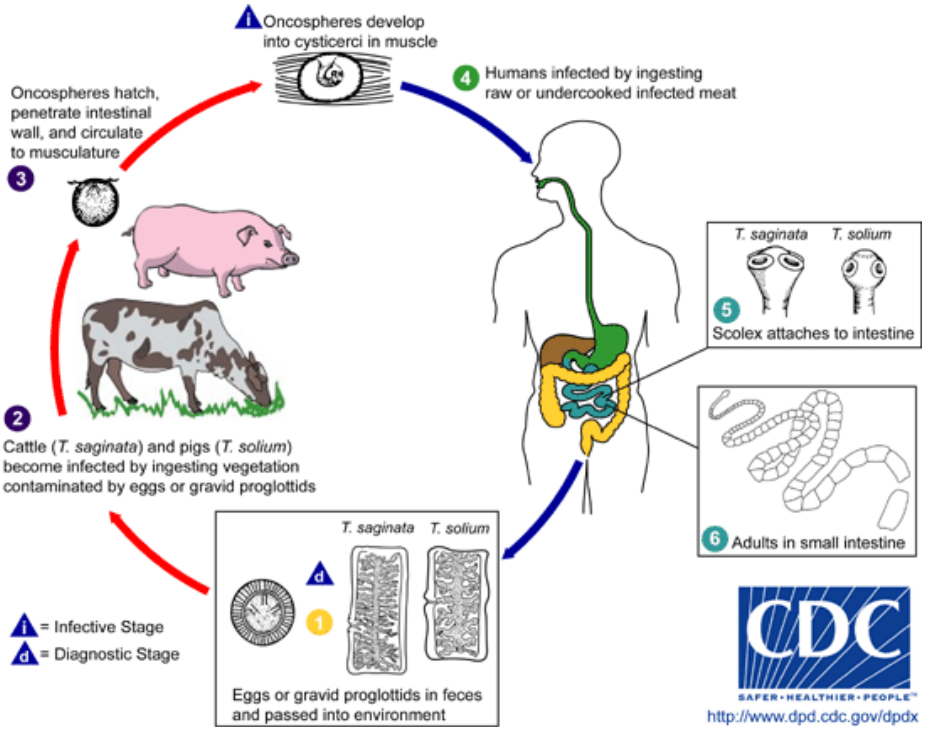
Cysticercosis is a parasitic infection primarily caused by the larval stage of the pork tapeworm *Taenia solium*. It is the most common parasitic disease worldwide, with an estimated 50 million cases. It is the leading cause of adult-onset seizures globally[1]. In the United States, cysticercosis is considered one of the neglected infections of poverty as well as a major cause of preventable epileptic episodes. It was found to be the etiologic agent in 10% of new-onset seizures in patients in California[1, 2]. The parasite is endemic in developing countries with suboptimal sanitation systems including Mexico, Haiti, India, and many countries in Central and South America, Africa, and Asia. Cases in the United States have primarily been identified in immigrants from endemic countries[3]. While most exposures are believed to have occurred in endemic countries, a growing number are recognized to have occurred due to contact with persons with taeniasis (adult tapeworm) residing in the US.

**Taeniasis:** Human tapeworm infection occurs when *T. solium* cysts in undercooked pork are ingested. Following ingestion, the larvae from the cysts attach to the intestinal wall and develop into adult tapeworms. Infection with the tapeworm stage is called taeniasis. Infected persons are often asymptomatic or only exhibit mild gastrointestinal signs. Human beings are the only definitive host of *T. solium*, meaning people are the only host that harbors the egg producing adult tapeworm stage of the parasite. Tapeworms may survive and shed eggs for several years. Autoinfection can occur when a person with taeniasis accidentally ingests eggs from their own tapeworm resulting in a secondary cysticercosis infection[1]. Autoinfection resulting in cysticercosis is believed to occur in approximately 20% of adult tapeworm infections[3].

Tapeworm eggs can be detected in the stool from 2 to 3 months after infection[1, 2, 4]. Diagnosis of *Taenia* tapeworm infection is made by microscopic examination (ova and parasite screens) of stool samples collected on three different days. The patient should also be asked about evidence of tapeworm segments in their stools. Stool testing does not generally provide *Taenia* species identification. Although the Centers for Disease Control and Prevention (CDC) has a serologic test for adult tapeworms, this test is available only as a research tool and may not differentiate between active and past infections, therefore it is not routinely utilized for diagnostic testing. Treatment with oral praziquantel or niclosamide, followed by retesting of stool for eggs 1 and 3 months later is recommended for persons with positive ova and parasite (O & P) screens. If the patient also has cysticercosis, praziquantel treatment should be used with caution as it kills both the cyst and adult tapeworm stages of the parasite[4].

**Cysticercosis:** Fecal eggs from humans can contaminate human or swine food. Following ingestion of the eggs, the larvae develop and migrate to various organs of the body to form a cyst stage or cysticerci (cysticercosis). The parasite may migrate to muscle, nervous tissue, liver, eyes, heart and skin, and is most severe when there is invasion of the central nervous system (CNS) or eyes. Neurocysticercosis is the neurologic manifestation of the disease. Both pigs and humans can act as intermediate hosts and harbor cysticerci, although neurologic disease is not typically reported in pigs[5] (Figure 1). Cysticercosis is acquired by ingesting tapeworm eggs shed in human feces, not by ingesting undercooked pork. **An individual with cysticercosis without adult tapeworm infection is NOT infectious to others**.

Figure 1: Life cycle of *Taenia solium* larvae




The clinical effects of cysticercosis vary depending on site of larval lodging, larval burden, and host reaction; therefore, the incubation period is highly variable, ranging from a few weeks to months or even years. Calcification of cysts is common following death of individual cysticerci. Reaction to the parasite itself or later degradation of the calcifications long after the parasite is gone may both result in clinical disease.

Screening and testing for cysticercosis in developed countries such as the United States is normally based on clinical findings coupled with a travel history or suspected infections in other household members. Cysticercosis is generally diagnosed through central nervous system (CNS) imaging by computer tomography (CT) scan or magnetic resonance imaging (MRI) in combination with serology[3]. There are two available serologic tests to detect cysticercosis, the enzyme-linked immunoblot transfer assay (EITB), and enzyme-linked immunosorbent assays (EIA or ELISA). The immunoblot test is preferred because it has a higher sensitivity and specificity and has been well characterized in published analyses. Confirmatory immunoblot testing is available at CDC. Samples should be submitted through the Florida Department of Health, Bureau of Laboratories. Combined imaging and serologic testing is recommended because serologic testing may be negative in cases of infections with low numbers of cysticerci or when calcifications are present and the parasite is gone. Alternatively, serology may be positive but imaging negative when cysticerci exist outside the CNS.

Treatment is dependent on clinical status and radiographic classification. In some cases, anti-parasite (antihelminthic) treatment can actually worsen clinical signs; therefore, careful assessment of the patient is important. Symptomatic treatment with anticonvulsants and steroids are typically the first line of treatment. Surgery may also be recommended in some cases.

Albendazole and praziquantel may be used if antihelminthic treatment is recommended. Table 1 provides a summary of key points related to taeniasis and cysticercosis.

Table 1: Synopsis of Key Points for *T. solium* Cysticercosis and Adult Tapeworms

| Disease Information | Taeniasis from *Taenia solium* (adult tapeworm) | Cysticercosis |
|---|---|---|
| Transmission | Consuming cyst stage in raw or undercooked pork | Fecal-oral transmission:<br>-eggs from humans feces via contaminated hands, food, or water.<br>-Autoinfection from feces to hand to mouth. |
| Incubation Period | Often asymptomatic; 8-14 weeks for fecal eggs production after consumption of larvae | Highly variable: weeks to months to years |
| Symptoms | Asymptomatic or mild: loss of appetite, weight loss and upset stomach or passing of tapeworm segments in feces | Variable depending on location of cysts: asymptomatic to fatal |
| Communicability | Persons with *T.solium* infections are infectious to others. | Not Infectious to others **ONLY IF** dual infection with adult tapeworm. |
| Diagnosis | Ova and Parasite exam (O & P) of stool samples (identifies *Taenia* to genus level)<br><br>Individual stool samples should be collected from 3 different days to increase sensitivity<br><br>Tapeworm eggs can be detected within 8-14 weeks after infected and continue to shed for years | CT Scan or MRI<br>And<br>Immunoblot (preferred) or EIA antibody test using serum or CSF<br>-may be negative in light infections<br>-may be negative when residual calcifications are visible on CT or MRI |
| Treatment | Mainly praziquantel or niclosamide. Rule out dual cysticercosis infection first if using praziquantel. | Symptomatic treatment with steroids and anti-convulsants. Careful assessment by health care provider before treating parasite itself with praziquantel or albendazole; anthelminthic treatment can worsen symptoms in some cases. Surgery in select cases. |

Case Investigation

On September 17, 2010, the patient was admitted to Hospital B in a neighboring county due to recurrent seizures and high fever. After further evaluation, the patient was found to have elevated liver enzymes and ringworm. He was administered the antiepileptic Keppra at a high dose, and griseofulvin for the ringworm infection. During hospitalization, a stool sample was tested for ova and parasites (O & P) on September 18; no parasites were detected. A second stool sample was recommended and obtained by the epidemiologist at Hillsborough CHD. The sample was sent to the Florida Department of Health, Bureau of Laboratories (BOL) Jacksonville branch for parasitology testing on September 18. The sample was negative for parasites and a third sample was not provided.

PCHD later learned that prior to this admission; the case-patient had been transported to a local emergency room (ER), Hospital A on August 16, 2010 after being found unresponsive with eye deviation to the right and twitching and constant seizures. He was transferred to a pediatric

hospital (Hospital B) where he was intubated. While hospitalized, he was administered Keppra to alleviate seizures and prednisone and diazepam for seizures that lasted greater than three minutes. In addition, he was treated with albendazole for neurocysticercosis; as magnetic resonance imaging (MRI) results illustrated calcifications in the brain suggesting neurocysticercosis. After consultations with infectious disease and neurology services, the patient was extubated on August 17. He gradually improved throughout the course of hospitalization and was subsequently discharged on August 28.

The case-patient is a 5-year-old Haitian-American boy with documented travel history to Haiti approximately two months prior to symptom onset (departure from US in June or July). He returned to the United States in August. Interviews were conducted on September 17 with household contacts in an effort to screen for potential exposures as well as to identify sensitive occupations. The aunt (Contact 6) who is the caregiver of the case-patient and the only adult in the Pasco County household fluent in English was the family spokesperson. She was asked to provide background information and to determine if contacts would be willing to be tested. She and the rest of the family agreed. All family members including the case-patient and mother (Contacts 1-7) reportedly traveled to Haiti within the past year. The adults were all born in Haiti, the case-patient was born in the US, while the birthplace of the other children was not determined. Contact 6 was an occupational food handler, the grandmother (Contact 4) prepared meals in the home setting, and the grandfather (Contact 5) was not involved with food preparation. The child's mother (Contact 7) lived in another Florida county and was an occupational food handler. A 2-year-old cousin, (Contact 3) reportedly experienced episodes of seizures in January 2010. Unfortunately, hospital records or diagnoses were not available for this child.

Following consultation with the Regional Environmental Epidemiologist, information regarding good hand and kitchen hygiene were provided to all family members, particularly food handlers. Good hand washing techniques were emphasized and the occupational food handler was advised to try to avoid handling ready-to-eat foods until O & P results were obtained. The family was provided with O & P containers with formalin and instructions for collecting the stool specimens over a three-day period. The stool containers were color-coded and labeled for each family member to prevent confusion during specimen collection. Five of six household contacts (Contacts 1 and 3-6) provided samples that were sent the BOL Jacksonville branch. Contact 2, a 6-year-old cousin, experienced continuing gastrointestinal symptoms beginning on July 14, 2010. He was taken to a local clinic on September 28 where a stool sample was collected and tested. Family members were also asked to provide serum samples. On September 21, four of six family members provided serum samples that were sent to the BOL Jacksonville branch. Serum samples could not be obtained from the two youngest children (Contacts 1 and 3), including the symptomatic cousin.

It was recommended that Contact 7 who resided in another county be contacted because of the quite variable time between exposure and onset, the history of shared travel, and the fact that this individual was also a food handler by occupation. A Palm Beach County (PBC) epidemiologist contacted her and a home visit was conducted on September 16 to deliver three O & P specimen containers. The PBC epidemiologist also provided education on the importance of practicing good hand hygiene particularly when handling food, and advised the contact to try to avoid handling ready-to-eat foods at work while stool testing was pending. The stool specimens were sent to the state lab for testing on September 27. On September 30, blood samples were also collected.

Tapeworm eggs were not detected in any of the stool samples of the seven household members (Table 2). Results from the serum samples were provided in October. Of the five serum samples, one (Contact 5) was positive for antibody to cysticerci, suggesting active or recently active cysticercosis infection (Table 2). This was the grandfather, who did not report being currently symptomatic. As of October 2010, there were no reports of recurrent seizures among any of the children with previous episodes. His pediatrician and an infectious disease doctor will follow the case-patient.

Table 2: Characteristics of Household Contacts with Potential Exposure to Taenia solium eggs

| | Age | Food Handler | Travel* | Cysticercosis symptoms | Date of Onset | O&P Results | Serum results |
|---|---|---|---|---|---|---|---|
| Case | 5 | No | Yes | Yes (seizures) | 8/16/10 | Negative** | Cysticerci |
| Contact 1 | 3 | No | Yes | No | | *Entamoeba coli* | Not done |
| Contact 2 | 6 | No | Yes | No | | *Giardia lamblia*** | Negative |
| Contact 3 | 2 | No | Yes | Yes (seizures) | 1/14/10 | *Entamoeba coli* | Not done |
| Contact 4 | 53 | Food handler at home | Yes | No | | Negative | Negative |
| Contact 5 | 54 | No | Yes | No | | Negative | Cysticerci |
| Contact 6 | 32 | Occupational food handler | Yes | No | | Negative | Negative |
| Contact 7[#] | 31 | Occupational food handler | No | No | | Negative | Negative |

*****Travel history to endemic country within the past year

**Only 2 stool samples collected from case; only 1 stool sample submitted from Contact 2 with testing performed at a private lab

[#] Lives in a different county

## Discussion

The main risk factors for cysticercosis are living in a household with a tapeworm carrier and travel to endemic countries. Epidemiologic assessment is particularly challenging for this disease due to the variable and potentially extended length of time between exposure and symptom onset. In this instance, the case-patient (confirmed) and Contact 5 (confirmed) traveled together to Haiti two months prior to symptom onset and could have acquired the infection there. The case-patient also had other trips to Haiti in prior years. Cysticercosis infection was also suspected in Contact 3, but symptoms occurred prior to the reported shared travel. Because of unrelated issues, detailed travel history for the family before 2010 was not available. In addition, no active tapeworm carriers were identified in the household. The case-patient and all contacts except contact 7 lived in the same household. It is possible that an infected household member had cleared a taeniasis' infection before testing, that another close contact remained unidentified, or that intermittent shedding prevented detection, particularly in the two family members with less than 3 stool samples collected (case-patient and Contact 2). Therefore, local transmission, exposure during travel, or different exposure events for family members cannot be conclusively ruled in or out.

When cysticercosis cases are identified, it is important that public health officials be notified in order to ensure appropriate follow-up and recommendations to household members and other

close contacts. Public health action is intended to identify and treat asymptomatic carriers, thus removing sources of continued transmission. Recommendations include screening high-risk household contacts for adult tapeworms (O & P). This is especially important when these contacts are food handlers or housekeepers. Serologic testing for cysticercosis is also recommended to help determine appropriate treatment for positive shedders and to provide additional epidemiologic information.

If it is suspected that a food worker (or other individual) may have taeniasis, proper hand washing techniques should be emphasized and if possible, the employee should try to avoid handling ready-to-eat foods while stool testing is pending. Employers should exclude food handlers who test positive for taeniasis from work until treatment is completed. To prevent taeniasis, persons should refrain from eating raw or undercooked pork when traveling to countries where cysticercosis is endemic. To prevent cysticercosis:

- Wash hands with soap and warm water especially after using the toilet, changing diapers, and before handling food.
- Teach children the importance of washing hands and proper technique.
- Wash all raw vegetables and fruits well before eating. When traveling in developing countries, avoid raw vegetables and fruits that cannot be washed and peeled.
- When in a developing country drink only bottled or boiled (for 1 minute) water or carbonated (bubbly) drinks in cans or bottles. Do not drink fountain drinks or any drinks with ice cubes.

Cysticercosis is not a reportable condition in Florida and most other states; hence, its true burden in the United States is unknown. States, especially those with a large immigrant population from endemic countries, should consider making cysticercosis a reportable disease to ensure appropriate public health response and to gather more information on the incidence of cysticercosis in the United States.

Acknowledgements
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Resources
CME activity: http://www.cdc.gov/eid/content/17/1/1_cme_activity.htm

Centers for Disease Control and Prevention (CDC)

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# Public Health History – County Health Department Origins

The following article is reprinted from the June 5, 1997 *Epi Update:*

**County Health Department Origins**

Dr. Albert V. Hardy, who served in many capacities during his career with the Florida State Board of Health (SBH), including that of Acting State Health Officer, wrote an article entitled "A Look at the Development of County Health Units in Florida" for the HRS (Health and Rehabilitative Services) magazine *Access* in September 1977. In his vignette, he details some of the trials and tribulations experienced by the SBH in its long crusade to establish community health services in every county of the state. Some excerpts from this interesting perspective follow:

> While Florida led in the evolution of public health services in communities, enigmatically, the state was one of the slowest of those in the South to establish full-time county health departments. Shortly after the turn of the century hookworm infestations were widely prevalent, preventing normal physical and mental developments. Those most severely affected were the poorer rural families. The first State Health Officer, J.Y. Porter, assigned two physicians to work temporarily in counties… to discuss the problem with physicians, teachers, and leaders and to locate infected individuals, treat them and follow them up. The program was widely commended… in 1909… Florida had a model program… (That) served as a guide for similar activities in 11 other states.
>
> In these states, using Rockefeller Foundation funds to control hookworms… it was soon appreciated that continuous rather than itinerant services were indicated. Ten county health departments were established in North Carolina as an experiment. By 1920 about 150 and by 1930 more than 500 county health departments had been established, predominantly in southern states – but none in Florida… the Florida State Board of Health had lean years from 1917- 1932: and… "Plans for the establishment of health units (devised by George Dame, Director of the Bureau of Communicable Diseases and Health Units)… (were)… temporarily abandoned on account of lack of funds." (When) Dr. Dame

left…(in 1922)… to reenter private practice… his place was taken by F.A. Brink, M.D. Dr. Brink prepared proposed legislation (after) visits to operating units in other states… After reporting his observations, Dr. Brink concluded: "There is a story of a rooster who called his hen-folk together, showed them an ostrich egg and said, "I do not wish to discredit your attainments but thought you should know what others are doing."

Initial efforts were not successful to have this enabling act passed by the legislature. In October 1929, Henry Hanson, M.D., became state health officer and promoted interest in this legislation. In mid-1930 Governor Doyle E. Carlton convened a statewide health conference "to inform the people as of the importance of securing full-time health service in every county within the state to the end that the enormous economic losses now sustained by reason of preventable diseases could be curtailed."… Governor Carlton presided, and… stressed that the people's health was their greatest asset and that his aim was to make Florida the healthiest state in the Union… In the following nine months there were objections die to the additional taxes required…The bill introduced at the 1931 legislative session passed.

Counties rapidly joined the health unit program. At the end of 1941, some 32 of them had organized units and by 1947, all but seven were so organized. Seventeen years later at a meeting of the Florida Public Health Association, Wilson T. Sowder, M.D. State Health Officer, replied to the question, "How has it worked?" in reference to the county health unit system: "I can hardly see how any one could answer this question in any way except – very, very, well. In the organization of overall community health services, Florida is well ahead."

## Florida Year-to-Date Mosquito-Borne Disease Summary Through May 14, 2011

***Leena Anil, Ph.D., Danielle Stanek, D.V.M., Carina Blackmore, D.V.M., Ph.D.***

During the period from January 2 through May 14, 2011, the following arboviral activity was recorded in Florida.

**Eastern Equine Encephalitis Virus (EEEV)**
Positive samples from five sentinel chickens and 13 live wild birds were received from three counties.

**West Nile Virus (WNV)**
Positive samples from 24 sentinel chickens were received from six counties.

**Dengue Virus (DENV)**
One case of locally acquired dengue in Miami-Dade County with onset date in January 2011 was reported. Five cases of dengue with onset in 2011 were reported in individuals with travel history to a dengue endemic country in the two weeks prior to onset. Countries of origin were Colombia, India, Nicaragua, Turks and Caicos Islands, and Venezuela. Counties reporting cases were Miami-Dade (3), Pasco, and Pinellas.

**Malaria**
Thirty imported cases of malaria with onset in 2011 were reported. Countries of origin were: Cameroon, Ethiopia (2), Eritrea, Guyana, Haiti (13), India (5), Liberia (2), Mali, Nigeria, Peru, Rwanda and Uganda. Counties reporting cases were Alachua, Brevard, Broward (3), Collier (2), Duval (3), Hillsborough, Indian River, Lee (3), Miami-Dade (7), Manatee, Orange, Palm Beach (3) Pinellas, Seminole, and St. Lucie. Seventeen (57%) were diagnosed with *Plasmodium falciparum,* 9 (30%) with *Plasmodium vivax,* 1 (3 %) with *Plasmodium ovale* and 3 (10 %) with undetermined.

**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. In 2011, one hundred and twenty nine reports representing a total of 430 dead birds (10 crows, 28 jays, 35 raptors, 357 others) were received from 37 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 program web site for more information:
http://www.doh.state.fl.us/Environment/medicine/arboviral/index.html.

***Please contact the Arthropod-borne Disease Surveillance Coordinator, Dr. Leena Anil at 850.245.4444 Ext.2437 or by email at Leena_Anil@doh.state.fl.us. Dr. Stanek is a medical epidemiologist with the Bureau of Environmental Public Health Medicine. She can be contacted at 850.245.4117, or by email at Danielle_Stanek@doh.state.fl.us. Dr. Blackmore is the State Public Health Veterinarian and the State Environmental Epidemiologist with the Bureau of Environmental Public Health Medicine. She can be contacted at 850.245.4732, or by email at Carina_Blackmore@doh.state.fl.us. The Bureau of Environmental Public Health Medicine is part of the Division of Environmental Health, DOH.***

# 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, April 1-30, 2011

| | Month | | | | Cumulative (YTD) | |
|---|---|---|---|---|---|---|
| **Disease Category** | **2011** | **2010** | **Mean†** | **Median¶** | **2011** | **2010** |
| **A. Vaccine Preventable Diseases** | | | | | | |
| Diphtheria | 0 | 0 | 0 | 0 | 0 | 0 |
| Measles | 3 | 0 | 0 | 0 | 5 | 0 |
| Mumps | 3 | 7 | 2.2 | 2 | 6 | 9 |
| Pertussis | 17 | 18 | 18.8 | 18 | 98 | 64 |
| Poliomyelitis | 0 | 0 | 0 | 0 | 0 | 0 |
| Rubella | 0 | 0 | 0 | 0 | 0 | 0 |
| Smallpox | 0 | 0 | 0 | 0 | 0 | 0 |
| Tetanus | 1 | 0 | 0 | 0 | 1 | 3 |
| Varicella | 119 | 128 | N/A | N/A | 357 | 389 |
| **B. CNS Diseases & Bacteremias** | | | | | | |
| Creutzfeldt-Jakob Disease | 4 | 0 | 0.2 | 1 | 7 | 2 |
| *H. influenzae* (invasive disease) | 31 | 32 | 18.2 | 8 | 100 | 76 |
| in those ≤5 | 3 | 2 | 5.4 | 6 | 10 | 8 |
| Listeriosis | 1 | 0 | 2.0 | 3 | 8 | 10 |
| Meningitis (bacterial, cryptococcal, mycotic) | 11 | 12 | 1.6 | 6 | 32 | 27 |
| Meningococcal Disease | 9 | 9 | 7.8 | 9 | 22 | 33 |
| *Staphylococcus aureus* (VISA, VRSA) | 0 | 0 | 0 | 0 | 0 | 0 |
| Streptococcal Disease, Group A, (invasive disease) | 28 | 23 | 25.4 | 28 | 38 | 53 |
| *Streptococcus pneumoniae* (invasive disease) | | | | | | |
| Drug resistant | 59 | 83 | 69.8 | 66 | 338 | 417 |
| Drug susceptible | 76 | 73 | 62.8 | 65 | 359 | 331 |
| **C. Enteric Infections** | | | | | | |
| Campylobacteriosis | 214 | 91 | 73.0 | 73 | 639 | 306 |
| Cholera | 0 | 0 | 0 | 0 | 8 | 0 |
| Cryptosporidiosis | 27 | 39 | 25.2 | 22 | 120 | 120 |
| Cyclospora | 2 | 1 | 1.4 | 1 | 20 | 10 |
| *Escherichia coli*, Shiga toxin-producing (STEC)** | 25 | 13 | 5.6 | 5 | 113 | 51 |
| Giardiasis | 96 | 137 | 104.2 | 99 | 370 | 561 |
| Hemolytic Uremic Syndrome | 0 | 1 | 0.4 | 1 | 1 | 4 |
| Salmonellosis | 297 | 247 | 245.6 | 242 | 948 | 1,082 |
| Shigellosis | 193 | 56 | 93.8 | 70 | 619 | 189 |
| Typhoid Fever | 1 | 1 | 1.6 | 1 | 4 | 6 |
| **D. Viral Hepatitis** | | | | | | |
| Hepatitis A | 6 | 13 | 15.0 | 13 | 34 | 48 |
| Hepatitis B, Acute | 17 | 31 | 29.8 | 31 | 72 | 99 |
| Hepatitis C, Acute | 5 | 14 | 4.8 | 3 | 25 | 40 |
| Hepatitis +HBsAg in pregnant women | 42 | 46 | 47.2 | 46 | 165 | 161 |
| Hepatitis D, E, G | 1 | 0 | 0 | 0 | 6 | 0 |

* Confirmed and probable cases based on date of report as reported in Merlin

Incidence data for 2011 is provisional, data for 2010 was finalized on April 1, 2011

† 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, April 1-30, 2011

| | Month | | | | Cumulative (YTD) | |
|---|---|---|---|---|---|---|
| **Disease Category** | **2011** | **2010** | **Mean†** | **Median¶** | **2011** | **2010** |
| **F. Vector Borne, Zoonoses** | | | | | | |
| Dengue | 0 | 3 | 1.4 | 3 | 11 | 13 |
| Eastern Equine Encephalitits†† | 0 | 0 | 0 | 0 | 0 | 0 |
| Ehrlichiosis/Anaplasmosis | 0 | 1 | 0.4 | 1 | 2 | 2 |
| Leptospirosis | 0 | 0 | 0.0 | 0 | 0 | 0 |
| Lyme Disease | 4 | 3 | 2.6 | 3 | 22 | 18 |
| Malaria | 6 | 7 | 4.8 | 6 | 30 | 38 |
| Plague | 0 | 0 | 0 | 0 | 0 | 0 |
| Psittacosis | 0 | 0 | 0 | 0 | 0 | 0 |
| Q Fever (acute and chronic) | 1 | 0 | 0 | 0 | 1 | 0 |
| Rabies, Animal | 9 | 12 | 9.6 | 10 | 36 | 39 |
| Rabies (possible exposure) | 142 | 180 | 117.0 | 106 | 592 | 641 |
| Rocky Mountain Spotted Fever | 0 | 1 | 1.2 | 2 | 3 | 2 |
| St. Louis Encephalitis†† | 0 | 0 | 0 | 0 | 0 | 0 |
| Toxoplasmosis | 2 | 1 | 0.4 | 1 | 3 | 2 |
| Trichinellosis | 0 | 0 | 0 | 0 | 0 | 0 |
| Tularemia | 0 | 0 | 0 | 0 | 0 | 0 |
| Typhus Fever (epidemic and endemic) | 0 | 0 | 0 | 0 | 0 | 0 |
| Venezuelan Equine Enchephalitis†† | 0 | 0 | 0 | 0 | 0 | 0 |
| West Nile Virus†† | 0 | 0 | 0 | 0 | 0 | 0 |
| 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 | 0 | 0 | 0 |
| Botulism-Infant | 0 | 0 | 0 | 0 | 0 | 0 |
| Brucellosis | 2 | 1 | 1.0 | 2 | 3 | 3 |
| Glanders | 0 | 0 | 0 | 0 | 0 | 0 |
| Hansen's Disease (Leprosy) | 1 | 0 | 1.0 | 1 | 2 | 2 |
| Hantavirus Infection | 0 | 0 | 0 | 0 | 0 | 0 |
| Legionella | 9 | 17 | 11.8 | 13 | 49 | 50 |
| Melioidosis | 0 | 0 | 0 | 0 | 0 | 0 |
| Vibriosis | 23 | 7 | 6.6 | 7 | 39 | 10 |

* Confirmed and probable cases based on date of report as reported in Merlin
Incidence data for 2011 is provisional, data for 2010 was finalized on April 1, 2011

† 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 2010 and 2009 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.***

## Upcoming Events

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

June 28: "Prescription Drug Poisoning: Epidemiology, Challenges, and Prevention in Florida and Sarasota County" presented by Kyla Shelton, M.P.H., Injury Epidemiologist with the Office of Injury Prevention, and P. Scott Pritchard, M.P.H., Epidemiologist with the Sarasota County Health Department.

## 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 to register on the EpiCom system by emailing the Florida Department of Health Emergency Notification System Helpdesk at FDENS-help@doh.state.fl.us. 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 and public health agencies during emergency situations. The following are titles from selected recent postings:

- Fifth Disease outbreak at a local elementary school, Nassau County
- Acute pesticide poisoning due to spraying equipment failure, Osceola County
- Malaria cases in refugee populations, Duval County
- Two unrelated mumps cases, Osceola County
- Influenza outbreak in a long-term care (LTC) facility, Palm Beach County
- Meningococcal disease, Miami-Dade County
- Suspect meningococcal disease, Pinellas County
- Imported malaria, Alachua County
- *Shigella* outbreak in a special-needs school, Orange County
- Two cases of imported Malaria, Collier County
- Hand, foot and mouth disease outbreak, Hillsborough County
- *Legionella* case and pneumonia cluster associated with local hotel, Volusia County
- E. coli O157:H7 in a child with multiple possible exposures, Clay County
- Meningococcal disease case in a corrections officer, Miami-Dade County
- Gastrointestinal (GI) illness at a local school, St. Johns County
- Foodborne outbreak investigation at a fast food Chinese restaurant, Hillsborough County
- Three unrelated cases of meningococcal disease, Miami-Dade County
- Brucellosis in a local resident, Palm Beach County
- Probable tetanus case in resident, Hernando County
- GI illness in an Assisted Living Facility (ALF), Hillsborough County

- Imported malaria case in a pregnant woman, Manatee County
- Confirmed dengue case in traveler from Brazil, Osceola and Orange Counties
- Foodborne outbreak investigation at a local BBQ restaurant, Pasco County
- *Shigella* outbreak at a local daycare, Miami-Dade County

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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 at http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/index.html.

For submission guidelines or questions regarding Epi Update, please contact Kim Bowman at 850.245.4409 or by email at Kim_Bowman@doh.state.fl.us.