Epi Update

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In This Issue

Meningococcal Disease in Florida, 1997-2006

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Background

The recent death of a University of South Florida college student from meningococcal meningitis prompted discussion within the health agencies of the state regarding meningococcal vaccine policies and requirements at state universities. Florida Statute 1006.69 and Florida Administrative Code 6C-6.001-5 requires that all university students must be informed of the dangers of meningococcal disease, given information about the vaccine, and those residing in on-campus housing must either show proof of vaccination or sign a declination. Some people within the university health system do not feel that this policy is adequate to protect students from the disease. A proposed change would require all entering students to be vaccinated against meningococcal disease unless they have a medical or religious exemption.

This review was designed to assess the burden of meningococcal disease in Florida over the past decade, the impact among the 18- to 24-year-old age group, and the proportion of those that are university students and living in on-campus housing.

Methods

Data regarding cases of meningococcal disease were obtained from the Merlin reporting system for notifiable diseases for 1997-2007. Florida disease codes 03600, 03630, and 03620 were combined into the meningococcal disease umbrella group. Duplicates were identified by using first name, last name, gender, race, age, zip code, and date of event. The data were then separated into two groups, 1997-2006 and 2007. This was done because the data for 2007 are incomplete.

For 1997-2006, various tables were created by year of diagnosis, age group, and other demographic information. Particular attention was paid to 18-24 years old since they are the most likely to be college attendees. Cases identified within the 18- to 24-year-old age group and occurring 2001 to present were extracted and forwarded to their county of origin to determine case history information. If the file was available, the county reported back whether the case attended college, either university or community college, and where they were living at the time of illness. Vital records were searched to identify students who died.

Results

Overall Meningococcal Disease Trends

The overall meningococcal disease incidence in the United States has been decreasing over the past decade.[1] Florida had a similar decline. The rate of disease among all ages combined was 1.13 cases per 100,000 person years in 1997, and fell to 0.42 cases per 100,000 in 2006 (Table 1). This is an approximately 60% decline in incidence over the decade.

Table 1. Incidence rate of Meningococcal Disease in Florida, 1997-2006, all ages combined and those 18-24 years old

Year	Cases for All Ages Combined	State of FL Population	Incidence Rate among all age groups, per 100,000 person years	Cases in the 18- to 24-year-old age group	State of FL Population of those 18-24	Incidence Rate among people 18-24, per 100,000 person years
1997	170	15,011,697	1.13	12	1,257,984	0.95
1998	152	15,309,968	1.01	15	1,291,703	1.16
1999	138	15,679,606	0.88	13	1,323,278	0.98
2000	136	16,074,896	0.84	24	1,341,111	1.78
2001	123	16,412,296	0.76	19	1,403,697	1.35
2002	128	16,772,201	0.76	14	1,437,445	0.97
2003	106	17,164,199	0.61	18	1,476,528	1.21
2004	107	17,613,368	0.60	15	1,592,679	0.94
2005	84	18,018,497	0.46	9	1,622,106	0.55
2006	79	18,440,700	0.42	15	1,655,205	0.90
State average single year (1997-2006)	**122.3**	**16,649,743**	**0.73**	**15.4**	**1,440,174**	**1.07**
State ten year average	**1223**	**1,440,174**	**7.30**	**154**	**1,440,174**	**10.69**

Age Group Meningococcal Disease Trends

The highest incidence of meningococcal disease in Florida still occurs among children less than one year old, but the incidence rates have fallen over the past decade in line with national trends. The trend in those 18-24 years old is less clear. The incidence in 2006 (0.90 cases per 100,000 person years) was slightly lower than in 1997 (0.95 cases per 100,000 person years), and variability between the years was great (Table 1). The gender and racial differences in incidence rates were not significant.

The cases among 18-24 year olds were displayed by county. All counties with less than 30,000 people were combined into an "other" designation (Table 2). The counties with the highest incidence rates were Lee, Leon, and Escambia.

Table 5. Ten year case counts for Meningococcal Disease among 18-24 year olds in Florida, by county, 1997-2006, all years combined*

*Rates for diseases with only a few cases reported per year can have unstable rates, and should be interpreted with caution. The observation of zero events is especially hazardous. To account for these instabilities, all rates in the report based on less than 19 events are considered unreliable. This translates into a relative standard error of the rate of 23% or more, which is the cut-off for rate reliability used by the National Center for Health Statistics.

County	Number of Cases	10 yr average Population of 18-24 year olds (1997-2006)	10 yr Incidence per 100,000 person years
Alachua	8	52,403	15.27
Brevard	3	36,678	8.18
Broward	11	126,238	8.71
Dade	25	214,697	11.64
Duval	11	80,786	13.62
Escambia	6	36,095	16.62
Hillsborough	9	100,596	8.95
Lee	10	31,301	31.95
Leon	10	54,366	18.39

Orange	12	105,432	11.38
Palm Beach	7	82,508	8.48
Pinellas	5	62,870	7.95
Polk	2	42,672	4.69
Seminole	1	32,927	3.04
Volusia	1	39,398	2.54
All other counties combined	33	340,211	9.70
State Total:	**154**	**1,440,174**	**10.69**

For those 18-24 years old, 68 out of 103 (66%) cases for which the serogroup was known were from vaccine-preventable strains, A, C, Y, and W-135 (Table 3).

Table 3. Cases of Meningococcal Disease among 18-24 year olds in Florida, 1997-2006, by serogroup*

	Serogroup									
Year	**A**	**B**	**C**	**W**	**Y**	**Vaccine Preventable Strains (A, C, Y, W-135) Total**	**Non-typeable**	**Other**	**Unknown**	**Total**
1997	0	2	1	0	2	3	0	1	6	12
1998	1	4	5	0	1	7	0	0	4	15
1999	0	3	2	0	3	5	0	0	5	13
2000	1	2	9	0	2	12	0	2	8	24
2001	0	3	7	0	1	8	0	0	8	19
2002	0	3	5	0	2	7	0	0	4	14
2003	0	2	4	0	4	8	2	0	6	18
2004	0	5	4	0	1	5	0	1	4	15
2005	0	1	2	0	4	6	0	0	2	9
2006	0	3	4	0	3	7	0	1	4	15
Total	**2**	**28**	**43**	**0**	**23**	**68**	**2**	**5**	**51**	**154**

*data has been validated through the Culture for Identification log book at the Bureau of Labs for years 2001-2007

Case History Investigation

For the follow-up case history investigation, 82 cases occurred among 18-24 year olds from 2001 to the present. Sixty nine of their case files were located and included information on the educational status of the case. The other cases were either no longer being housed due to the three-year requirement for maintaining files, or did not contain information on the issues under examination. Out of the 69 cases, 22 (32%) were students at the time of their illness. Two students were identified as community college attendees, one as a university student, and the rest were unspecified. Only one student was identified as living in on-campus housing, and one additional student lived in a sorority house, but was not under the purview of the school housing authority. When serogroup information was examined for those 22 students, 10 cases were from vaccine preventable strains. Among the 18- to 24-year-old cases from 2001 to the present, there were seven deaths, four of them occurring among students.

Discussion

Meningococcal disease is a very serious condition that can have significant sequelae. The groups at highest risk in Florida are children less than one year of age, which follows national data.[2] National research among 18-24 year olds, the age group of focus for this study, indicated that the people most at risk are freshmen living in on-campus housing facilities.[2] There is no research evidence that simply being a university student puts someone at increased risk for meningococcal disease.

In Florida, the incidence rate among 18-24 year olds is not higher than many other age groups. About one-third of cases in this age group are among students, including community college, college, and university students. Current vaccine policies are based on national data showing that freshmen living in on-campus housing are at higher risk than other people their age as well as other students not living in on-campus housing. Florida data do not contradict this finding.

If mandatory vaccination had been required of all students at state university campuses, there would have been 217,523 total entering students from 2001 to the present that would have needed vaccination. At $63 per dose of the vaccine, that translates into a cost of $13,703,949. Among the identified student population during 2001 to the present, there were 10 cases infected by vaccine preventable strains. If vaccination coverage were at nearly 100%, and if all 10 of the cases were university students, and considering vaccine efficacy, this potentially could have prevented eight to nine meningococcal disease cases. It is unknown how many additional cases would have occurred had universities not been requiring vaccination of entering students living in dormitories during this time.

Florida's County Health Departments do a good job of identifying meningococcal disease cases and tracking their close contacts in order to distribute antibiotic prophylaxis. There are very few secondary cases in Florida, at least in part because of this consistent, vigorous response.

While vaccination policy changes are being considered, the focus of current meningococcal disease interventions should be education and voluntary vaccination of entering students living in on-campus housing. Entering students should be made fully aware of the dangers of meningococcal disease and the benefits of being vaccinated, and enforcement of the current policy should be a priority. Identifying and tracking residents who live in on-campus housing to verify that they have received the vaccine or have actively decline it is the first step.

References:
1. Centers for Disease Control and Prevention, "Summary of Notifiable Diseases-United States, 2005," *MMWR* 2007; 54(53).
2. Centers for Disease Control and Prevention, "Prevention and Control of Meningococcal Disease Recommendations of the Advisory Committee on Immunization Practices (ACIP)," *MMWR* 2005; 54(No. RR-7).

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Gastrointestinal Illness Outbreak at a Construction Site in Miami Beach, Miami-Dade County, June 2007

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Background
At approximately 4:00 p.m. on Monday, June 4, 2007, the Miami-Dade County Health Department Office of Epidemiology and Disease Control (MDCHD-OEDC) received a phone call from the Miami Beach Fire Rescue Department reporting that several workers at a construction site on Miami Beach had fallen ill. Some of the ill workers were taken to two local hospitals in ambulances. Firefighters stated that the construction workers had recently eaten food purchased at a mobile truck that frequently serves lunch at that site. OEDC decided to conduct an investigation to determine the possible source of the illness. The Florida Poison Control Center, the Florida Department of Business and Professional Regulation (DBPR), and the MDCHD Office of Environmental Health were also informed of the incident.

Methods
Four epidemiologists from OEDC arrived at the construction site at approximately 5:00 p.m. on June 4. OEDC staff discovered that the food dispensing truck was regulated by the Florida Department of Agriculture and Consumer Services (DOACS) and that three different catering companies sold food to the truck owner. DOACS and OEDC conducted a joint inspection of the truck and catering facilities on the morning of June 6. Two epidemiologists were escorted by officers from the Miami Beach Police Department and conducted interviews with the owner of the mobile truck and the catering companies. The other two epidemiologists went to one of the hospitals and interviewed several of the ill patients. Interviews using the MDCHD Environmental Health Foodborne Illness Survey/Complaint Form were completed with six ill patients. Three stool samples

and two vomitus samples were collected and sent to the Bureau of Laboratories Miami Branch for bacterial stool culture and ova and parasite testing. A case was defined as a construction worker who was present at the work site on June 4 and had symptoms of diarrhea and
/or vomiting.

Laboratory Results

Stool and vomitus samples

Staphylococcus aureus was isolated in large quantities from all five of the stool and vomitus samples. Enterotoxin testing was not performed. Stool samples were negative for *Salmonella, Shigella, Campylobacter, Escherichia coli* O157:H7, or other bacterial pathogens.

Food

Food from the lunch truck was discarded and not tested. Therefore, no specific enterotoxin could be isolated from epidemiologically implicated food.

Results

Ill worker investigation

A total of nine construction workers met the case definition for gastrointestinal illness during this outbreak. Eight of the ill workers were sent to one hospital, and one worker was sent to another hospital. The analysis was based on interviews obtained from six workers. The median age for the ill workers was 24 years (range: 19-51 years) and five (83.3%) were male. The mean incubation period from the time of eating lunch from the truck to the onset of illness was 2 hours and 15 minutes (range: 1 hour to 3 hours, 10 minutes). At the time of interview, which was approximately four hours after the time of onset, five workers (83.3%) were still experiencing symptoms. Nausea, vomiting, and diarrhea were symptoms experienced by all of the ill workers while five (83.3%) also had symptoms of cramps, chills, weakness, and fatigue. Interviews also showed that four workers (66.7%) experienced sweating, three (50.0%) had a headache or dizziness, two (33.3%) had numbness, and one (16.7%) had fainted. None of the ill workers had fever. Five workers (83.3%) had watery diarrhea, one (16.7%) had mucousy diarrhea, and none had bloody diarrhea. Only information about foods eaten on the day of the event was obtained. All of the ill workers had eaten a rice dish mixed with eggs and assorted meats. Although other foods were eaten among the ill, this was the only common food reportedly eaten among all the ill workers. Therefore, the rice dish was suspected to be the source of illness. Although no case-control study was conducted, coworkers of the ill who were present at the hospital stated that workers who did not become ill had eaten pizza from the same truck or had eaten elsewhere. In addition, the ill patients stated that there were more coworkers that were ill; however they went home rather than going to the hospital. There was no follow-up with the ill workers that were not hospitalized, and therefore the exact number of ill workers is unknown.

Mobile lunch truck and catering company investigation

Upon arrival to the site of the mobile lunch truck, it was determined that there was no leftover hot food from the lunch at the construction site. Two Miami Beach Police Department officers and two OEDC staff went to look for the lunch truck in another part of the county and visited the facility of the first catering company. The only food that was left in the truck was cold food packed in ice. The truck owner was unable to produce any of the DOACS licenses required for the selling of his goods. Observations at the catering facility included a table with cardboard crates storing hard-boiled eggs that were left out at room temperature and catering staff preparing wraps without wearing gloves. No hot food was being prepared at the time, because it was mentioned that hot foods such as the rice dish are prepared earlier in the day. When OEDC staff asked to visit the second catering company, the truck owner said that he did not know the specific location of the site and therefore this area was not inspected. An interview and inspection of the third catering company was not deemed necessary because this company only sells pre-packaged items and drinks. The other construction sites visited by the mobile truck did not report any additional ill persons.

Miami-Dade Fire Rescue and Miami Beach Police Department investigation

Both departments conducted an on-site evaluation of the construction facility and determined that there were no environmental exposures other than food from the mobile truck. The criminal investigations unit of the Miami Beach police ruled out a criminal act.

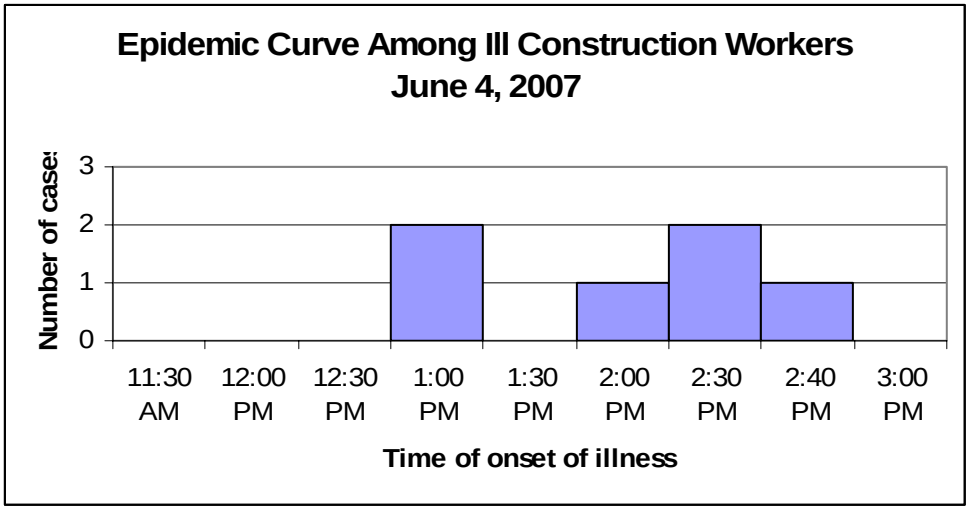
Department of Agriculture and Consumer Services investigation
The investigation was conducted on June 6 from 4:30 a.m. to 8:30 a.m. at the facility that houses the preparation and selling of foods that are sold primarily on mobile trucks in the South Florida region. Several hundred mobile vendors were purchasing and loading their trucks with food items such as rice dishes, meats, eggs, seafood, tacos, wraps, bean soups, salads, pastries, sandwiches, drinks, fruits, and prepackaged dry goods from various businesses. DOACS inspectors were able to document the licensed facilities. The investigation focused on rice dishes with egg as an ingredient since this was the suspected vehicle in the outbreak to which all ill were exposed.

The joint DOACS and OEDC team visited two of the catering vendors that supplied food to the mobile truck on the day the workers became ill. Upon investigation, it was determined that one of the vendors did not use eggs in their dishes and did not sell rice dishes on that day. The second vendor does sell a variety of rice dishes that may contain eggs, but the mobile truck owner denied purchasing such an item from that particular vendor on that day. The truck owner's assistant stated that in an effort to save time, some rice dishes were purchased at the facility site prior to loading food products onto the truck. However, no documentation was given for the purchase of those rice dishes, and it is suspected that the rice dishes were purchased from an illegal vendor at the loading site. Suppliers and truck owners described how purchasing from non-licensed vendors is an ongoing problem for that facility. The investigators did not observe illegal purchases on the day of the inspection. However, the facility had received advance notice that inspectors would be visiting on that day, and as soon as the inspectors arrived, several food vendors left the building. Though no formal interview was conducted, it was suggested by various workers that those vendors who left the premises did not have licenses to sell their goods.

Conclusions
The suspected common food vehicle in this outbreak was a rice, meat, and egg dish bought from an illegal and unapproved source. This outbreak is suspected to be caused by *Staphylococcus aureus* enterotoxin based on the short apparent incubation period and symptoms. The diagnosis is not directly supported by the laboratory data. Based on the symptoms, incubation, and the type of food (rice), this outbreak could also have been caused by the short incubation period toxin of *Bacillus cereus*. The size and scope of the mobile lunch truck operation involves thousands of customers at various levels. This includes preparation, distribution, and sales to the consumer. The particular vendor that produced this rice dish was not found. OEDC recommended that the regulatory agencies involved take action to solve the illegal food vendor problem. This is essential in order to protect consumers from possible food contamination likely to occur in unlicensed and unregulated facilities.

Table 1. Symptoms among the ill workers (n = 6)

Symptom	Number	Percent
Nausea	6	100.0
Diarrhea	6	100.0
Vomiting	6	100.0
Cramps	5	83.3
Chills	5	83.3
Weakness	5	83.3
Fatigue	5	83.3
Sweating	4	66.7
Headache	3	50.0
Dizziness	3	50.0
Numbness	2	33.3
Fainted	1	16.7
Fever	0	0.0



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Measles Response Using the Incident Command System (ICS)

Emily Wilson, R.S., M.P.H.

In May 2007, five patients with laboratory-confirmed measles were found to be epidemiologically linked to a patient who had returned from India in early April. All five patients were part of an eastern religious sect with low vaccination rates. The response to the measles outbreak used an Incident Command Structure (ICS) that mobilized resources from multiple areas of the community and health department towards a single coordinated and organized containment strategy. This is in contrast to a *B. pertussis* outbreak in 2005 within the same community where all facets of the outbreak were worked by a single epidemiologist with part time assistance. Two generations of measles transmission from the index case passed prior to a report to the health department, and a large outbreak was expected. It is essential in public health to improve the recognition and early reporting of rarely seen vaccine-preventable diseases such as measles.

On Sunday, April 29, a student health clinic contacted the Alachua County Health Department on-call nurse to report identification of Koplik spots on a patient suspected to have measles. An investigation was initiated immediately. On April 30, the health department went to the home of the student to complete an interview to identify a source, elicit contacts, and draw blood to verify the diagnosis. Information from the interview indicated that multiple person-to-person transmissions had occurred, and the outbreak was in the third generation. Since measles has greater than a 90% secondary attack rate among susceptible persons,[1] it was possible that an extensive outbreak was underway. From experience with the *B. pertussis* outbreak, the health department knew there was a low acceptance of vaccination in this community. The community day school on the temple grounds had 68% of students without MMR vaccination. Graduation activities from the major university were scheduled for that weekend of May 4, with many out of town guests expected. Afterwards, the students would be dispersed for the summer.

[1] Centers for Disease Control and Prevention, Epidemiology and Prevention of Vaccine Preventable Diseases, Atkinson W, Hamborsky J , McIntyre L, Wolfe S, eds., 9th ed. Washington DC: Public Health Foundation, 2006.

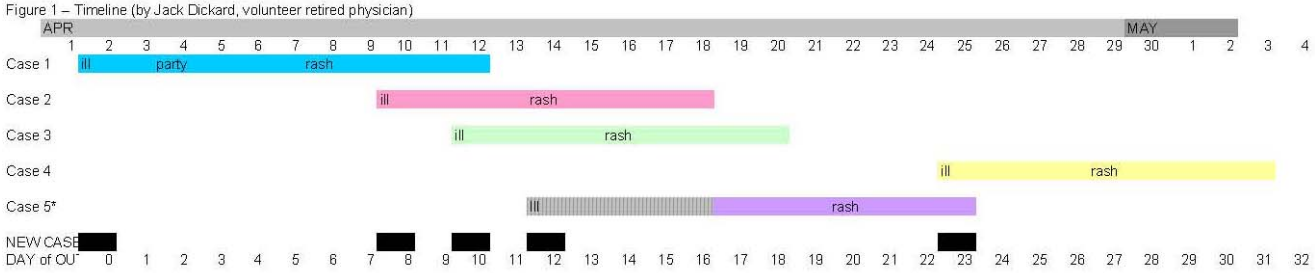
When the laboratory confirmation for measles was received on May 1, an Incident Commander (Public Health Director) and Operations sections (Nursing Director and Disease Control Administrator) worked to meet the immediate need to contact and communicate with many affected communities. A Joint Information Center (JIC) was added to the command staff utilizing the major hospital, the university, and the county government representative. The JIC developed and relayed important information to the media. The event was on the evening news and front page of the local paper. Notices were sent to the staff and students of the university and community college.

Three branches were added to the Operations Section: Education, Disease Investigation, and Vaccination. The Education Branch was staffed by individuals from the public school board, the university, and the community college. Individuals from sister agencies were brought into the briefings by telephone or in person. School health nurses at the public schools identified students that had exemptions from vaccination and made decisions to exclude them on a case-by-case basis.

In building the Disease Investigation Branch, assistance was requested from the regional epidemiologist and a local nurse practitioner from the health department clinic. Temporary reassignment of all 15 local Disease Control staff was required to keep up with the demand. A log of over 60 phone calls the first week identified the type of concerns being received. Not all calls were logged. Calls that were technical in nature were transferred to the nurse epidemiologist. Two epidemiologists conducted the field investigations for data collection and case finding. Active surveillance was conducted at eight primary care and hospital healthcare providers, the area private/charter schools and day care on the temple grounds. Daily active surveillance contact was made with each of the three major hospitals. Disease Intervention staff already familiar with the medical community were sent to retrieve lists of contacts from possible waiting room exposures. People suspected of having measles were sent to a separate entrance at the health department and instructed not to go into the main lobby.

Each case that was interviewed generated lists of contacts during the period of communicability, and data collection and information management became increasingly important. Over 250 contacts were identified. An outbreak was set up in the Merlin outbreak module to track these contacts. The program was able to record the demographics, the vaccination history, and the contacts by person or setting. The activities of people with laboratory-confirmed measles were hand charted on individual calendars marking the onset of symptoms, the incubation period to identify the source, and the period of communicability. These calendars were color coded by person and a master calendar was compiled. In addition, a timeline was kept (Figure 1).

Figure 1 – Timeline (by Jack Dickard, volunteer retired physician)



* case 5 symptom onset not recalled accurately due to late case finding and confounding factors with other health problems noted by physician
Incubation period: 14 days from exposure to rash onset
Period of Communicability: 4 days prior and 4 days post rash onset

On May 2, the health department met with the religious community at the temple office to request their assistance in implementing containment strategies for a minimum of 24 days. The strategies included requests to:

- Not congregate among the church community to reduce infection rates.
- Not attend school of any type, and use home schooling methods to complete tasks.
- Not travel until this period is ended.
- Not serve food on campus unless all are fully vaccinated.

However, if the individual could show either proof of two doses of measles vaccine or a birth date prior to 1957, the exclusion could be lifted.

Cultural observances had to be incorporated into the vaccination procedures and the investigation.

- Members of the community used spiritual names, while also using another name in public. This complicated the investigation and data collection.
- It was discovered that it was best to wear slip-on shoes since taking shoes off upon entry into a building was necessary.
- Some temple members were concerned about the use of bovine derivatives in the MMR vaccine.

When the Temple Commander agreed to arrange vaccination clinics on the grounds of the community property, the health department set up a vaccination clinic outside the temple on Sunday afternoon. This was done in anticipation of a possible large measles outbreak. The Incident Commander went into the temple to encourage people to be vaccinated.

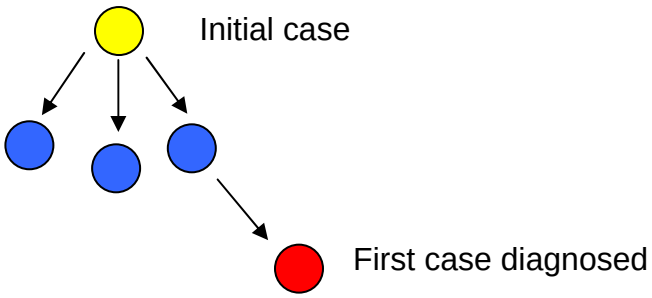
The Vaccine Branch, within the Operations Section, was led by the Immunizations Program Manager. This branch conducted the administration, tracking, and mobilization of field clinics to increase the MMR vaccination rates for the population of Alachua County. The religious community was offered an on-site free vaccine at the temple grounds and the two schools. In addition, if people identified themselves as part of that community and came into the health department, a free MMR was administered. Vaccine was given to the college health clinics who could then administer it to the students and staff. The health department employee vaccination records were reviewed. Anyone having only one MMR and born after 1957 was required to receive another MMR. By June 1, when the event was declared over, more than 200 people received MMR vaccine at the health department.

A Planning Section Chief was assigned, redirected from his normal job as a Human Resource Specialist. He began attending the morning and evening briefings to track the summary of current actions (ICS 201-2) and record the objectives and priorities (ICS 202). These objectives were assigned to persons responsible for their completion. The first day had 13 objectives with seven individuals assigned. Two of the seven were representatives from the schools and university who needed to communicate to their students and staff given that commencement was only a few days away. The daily development of ICS 202 and briefings continued until May 23, a full three weeks. This provided a record that was valuable during and after the event.

Logistics and Finance sections were operational for part of the event. The Logistics Section assisted with providing the materials and equipment to hold the clinic at the temple. The Finance Section determined a method for tracking the employees' time using a disaster timekeeping system.

The use of an Incident Command System (ICS) in the public health response resulted in a quick response and an organized operation. It set clear daily objectives, identified who was responsible for which actions, appointed a public information spokesperson, provided operations command oversight, and allowed for the event sequence to be captured by the planning section. By demonstrating the ability of ICS to expand and contract to fit the natural progression of a public health event, other response initiatives may benefit.

One gathering in a private home with a traveler returning from India resulted in three more people developing measles, including one infant. A household member of one of those patients then became ill. The traveler sought care at a walk in clinic and an emergency room that week. Altogether, five patients sought medical care in eleven different instances; only one healthcare practitioner recognized measles and reported it to the local health department. Measles is reportable upon suspicion without waiting for a laboratory confirmation. If one of the initial practitioners had recognized and reported measles upon suspicion, the health department could have notified additional providers more quickly and could have offered protection and containment measures.



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Infant Botulism, Duval County

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Background

On August 29, 2007, the Duval County Health Department (DCHD) Epidemiology Program was contacted by the Regional Florida Department of Health (DOH) Food and Waterborne Disease (FWD) Epidemiologist regarding testing a patient for botulism. The Regional Epidemiologist had received a call from the FL DOH Bureau of Laboratories Jacksonville regarding a call from a local hospital laboratory requesting instructions about testing two products for botulism.

DCHD Epidemiology staff phoned the hospital laboratory, obtained demographic information on the 8-month-old male patient and referred the laboratory personnel to the Botulism Manual on the Centers for Disease Control and Prevention (CDC) website for detailed information and instructions. The FL CDC Epidemic Intelligence Service (EIS) officer was contacted and he phoned the patient's attending physician, the hospital laboratory, the CDC, and the California Infant Botulism Center. Epidemiology staff completed record reviews, parent interviews, and spoke with hospital staff and healthcare providers.

Case Investigation

Upon admission to the hospital on August 27, the child presented with decreased oral intake, difficulty swallowing, loss of head control, lethargy, hypoglycemia, and constipation. The child exhibited a "floppy baby" appearance. Intravenous fluids were given and a feeding tube was inserted. His respiratory status was sufficient without artificial ventilation. Medical evaluation included workups for sepsis, and inborn errors of metabolism, as well as endocrine, cardiac, and neurological conditions.

Serious consideration for botulism was given on day two of hospitalization when risk factors were identified. The child was constipated three weeks prior, for which he was given corn syrup and oral probiotics. Small amounts of apple juice were given to relieve hiccoughs. Oral Nystatin was given for thrush. Breastfeeding was supplemented with formula when mastitis and candidiasis affected the mother. The father's work at a nursery and landscape company may have exposed the child to dirt and dust particles.

BabyBIG, the human derived Botulism Immune Globulin Intravenous, was given on day five of hospitalization with approval from the California Infant Botulism Center. The syrup, probiotics, and some remaining apple juice brought from home were sent to the CDC and the U.S. Food and Drug Administration (FDA) for testing.

An enema-induced stool specimen was sent to the CDC and tested positive for Botulinum Toxin A. Cultures of the corn syrup, probiotics, and apple juice samples were negative for botulism.

The child was discharged from the hospital on day 13 with the feeding tube in place. A home visit was made by the epidemiology nurse and the FWD Regional Epidemiologist and no other apparent sources were identified. The child has progressed well, is taking formula, and is gaining strength and mobility. The child continues to be evaluated by his physician.

Discussion

Infant botulism results after ingested spores of *C. botulinum* germinate in the intestine and produce botulinum toxin.[1] Most cases occur in breastfed infants at the time of first introduction of nonhuman milk substances, but the source of spores is usually not identified.[1] Honey has been identified as a source of spores, but to date, neither corn syrup nor probiotic solutions have been implicated in this condition.[1] In the absence of serious hospital-acquired complications, there are usually no long-term consequences associated with infant botulism illness and the prognosis is for complete recovery.

Diagnosis of infant botulism is suspected on clinical grounds and confirmed by laboratory testing. Testing may involve three steps: first, stool testing for botulinum toxin; second, stool culture for *C. botulinum* organisms; and third, testing of food sources for *C. botulinum* spores. Food testing is performed only if at least one of the stool tests is positive. Serum testing is not recommended as toxin has been demonstrated in only 1% of infants with botulism. All testing for Florida residents is done at the CDC. All suspected cases of infant botulism should be discussed with the Florida Bureau of Epidemiology. Bureau staff will in turn consult as needed with the Infant Botulism Treatment and Prevention Program at the California Department of Public Health.[1, 2]

Medical science does not yet understand all the factors that make a baby susceptible to botulism spore germination. After long-term testing of multiple items placed in infants' mouths, it was concluded that most infant botulism patients acquired their spores by swallowing microscopic dust particles that carry the spores.[2]

Infant botulism is the most common type of human botulism in the United States.[2] This case is the first known and documented infant botulism case in Duval County. There have been two other cases reported in the Florida Merlin data system, one in 2005 and another in 2004. According to CDC 2007 provisional data, 63 cases have been reported in the United States as of October 13, 2007.[4]

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Early Detection of a Northeast Florida Red Tide, *Karenia brevis*, in Employees of a Nassau Beach Dredging Project

Rebecca Lazensky, M.P.H.; Kim Geib, M.S.N., A.R.N.P.; Andy Reich, M.S., M.S.P.H.

Background

The Nassau County Health Department (NCHD) Epidemiology and Environmental Health staff were contacted on September 25, 2007 by a supervisor of a local dredging company reporting a cluster of illnesses in employees at their Fernandina Beach job site. Thirteen ill employees, seven day shift and six night shift, were located at the beach site, all with unknown health status at the time of initial report. Health complaints included upper respiratory symptoms such as coughing, sneezing, and difficulty breathing while working at the beach. An estimated 50 employees were stationed offshore on a dredge boat and did not report symptoms. On September 25, NCHD began interviewing ill employees to investigate the cause of these illnesses and to address concerns from the company that employees may have potentially been exposed to hazardous waste materials during dredging operations.

The company is contracted annually by the U.S. Army Corps of Engineers to dredge a channel for military submarines to navigate the Amelia River. Currently the company is overseeing a project that operates six miles of pipe along the beach connected to an offshore dredge boat. The dredge extracts sand from the ocean floor, pumps the materials on shore, and distributes it as part of a beach nourishment project. Employees were located at the site where the extracted sand is distributed on the beach and onboard a boat three miles offshore.

When NCHD staff arrived at the beach site on September 25, they noted a smell and taste that was similar to conditions previously observed during a red tide field study in the Gulf of Mexico. Numerous fish kills and respiratory symptoms, such as coughing and sneezing in beach attendees, were documented. Shortly after arriving to conduct interviews, NCHD began receiving multiple calls from the public reporting similar symptoms while visiting the beach several miles along the Nassau County coast, not limited to the area where the dredging project was located.

NCHD immediately contacted the FL-DOH Aquatic Toxins Program (ATP) to report a suspect red tide in Nassau County, a rare event for Northeast Florida. The ATP coordinated laboratory testing with the Florida Fish and Wildlife Research Institute (FWRI) and elicited local NCHD Environmental Health staff to collect water samples. In addition, the ATP assisted local county health departments (CHDs) by implementing the state-based harmful algal bloom (HAB) response plan as red tide toxins were later detected in Duval, St. Johns, Flagler, and Volusia counties.

Methods

NCHD conducted 26 interviews from September 25 to September 28 with employees of the dredging company: 14 with beach site employees, 10 with offshore boat employees, and two with field engineers located in an office building. Beach and boat employees are required to complete 12 hours shifts, experiencing a lengthy occupational exposure to red tide. Field engineer interviews were excluded from the analysis due to their minimal exposure to red tide. For purposes of statistical comparison, 20 interviews were included in the analysis; 10 beach and 10 boat employee interviews.

Results

Laboratory

On September 26, FWRI reported that samples collected on September 25 from Nassau County's Fernandina Beach detected medium to high levels of *Karenia brevis* cells, which emit toxins capable of causing human health symptoms. Subsequent samples collected on October 10 detected a return to baseline levels of *Karenia brevis*. This data, coupled with a decline in health complaints beginning September 29, indicated a return to acceptable levels of red tide as of October 11.

Beach Interviews
The following summary is limited to beach employees interviews (n=10) on September 25 as this was the symptomatic population. Beach employees reported an excess of symptoms in comparison to employees stationed on the boat. This may be due to wind direction, which can carry red tide brevetoxins on shore and cause more symptoms in persons located on or near the shore or patchy near-shore blooms not present in offshore waters.

The range in illness onset dates in beach employees was September 16 to September 25, with peak onset dates of September 22 and September 23. The drilling project began on September 16. Symptoms reported in >=90% of beach workers were coughing, eye irritations, sneezing, sniffling, and throat irritation (Table 1). The mean age of employees was 53.3 [range=46-66]. Eight of the 10 persons were male. One person reported a pre-existing breathing condition, and four persons reported pre-existing health conditions. Five persons reported a recent history of smoking. All persons reported occupational water exposure to both sea mist and discharging pipe spray. In addition to job exposure, two persons reported recreational water exposure. None of the cases experienced symptoms that impaired their ability to function and complete their job.

Respiratory symptoms persisted in beach employees from September 16 to September 29, when a storm with winds from the northeast altered onshore wind patterns and the location of the red tide bloom, resulting in an abrupt end in beach employee and public complaints as well as a decrease in the *Karenia brevis* cell count levels detected in water samples.

Table 1: Symptoms Reported by Beach Workers (n=10) and Boat Workers (n=10)

Symptom	Beach Workers	Boat Workers
Abdominal pain	0	1
Breathing difficulty	4	1
Coughing	10	2
Cramps	0	0
Diarrhea	2	0
Dizziness	1	1
Eye Irritations	10	1
Fatigue	1	3
Fever	1	0
Headache	4	1
Itchy Skin	3	1
Myalgia	1	2
Mucous w/cough	7	2
Nausea	1	2
Nose irritation	1	2
Rash	0	0
Sneezing	9	2
Sniffling	9	1
Throat irritation	9	3
Vomiting	1	0
Weakness	2	2

Conclusions
Historically, the dinoflagellate, *Karenia brevis*, which produces Florida red tide, has been detected in medium to high concentrations from Northeast FL (defined as coastal counties located north of Brevard county) in 1980, 1983, and 1999, in St. Johns, Flagler, and Volusia counties (Fish and Wildlife Conservation Commission [FWC] unpublished data, 2007). Due to the unfamiliarity with red tides in recent history in Nassau County, a large volume of public inquires and media requests were processed by the NCHD, initially averaging approximately 20 calls per day. NCHD and Nassau County Emergency Management (NCEM) issued a beach

advisory on September 25 and four subsequent press releases. Blast faxes were sent to healthcare providers, local hotels, and local veterinarians. Increases in respiratory complaints were reported by local hotels, veterinarians, and the hospital Emergency Department (ED). The Miami Poison Control Center received citizen complaints reporting minor respiratory irritation beginning on September 26. NCHD provided Nassau County Commissioners with recommendations for the disposal of fish kills located along the beach. This investigation demonstrated the role public health partnerships play in rapidly identifying a cause of unknown illnesses and the importance of responding to clusters of unidentified illness in the community.

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Florida Epidemic Intelligence Service (FL-EIS) Recruitment for Fellows and Preceptor Host Sites 2008

Patti Ragan, Ph.D., M.P.H., PA-C

It's almost time to start a new year again, and that means the recruitment efforts for the Florida Epidemic Intelligence Service Program (FL-EIS) are getting underway!

If you are not already familiar with FL-EIS program, it was started in 2001 as part of the state's response to terrorism. The program offers two-year, post-graduate applied epidemiology training to master's or doctoral graduates in the health sciences who have a strong interest in public health epidemiology. The goals of the program are to increase the capacity of the Department of Health and county health departments to respond to challenges in disease control and prevention, and to develop future leaders in the field of public health. County health departments throughout the state act as host sites for the fellows, who in turn provide assistance with outbreak investigations, surveillance, public inquiries, education, and other epidemiologic activities.

It is anticipated that seven fellows and preceptors sites will be selected for the class entering in June 2008.

Qualifications for fellows include: Persons with a master's or doctoral degree in a health-related field (e.g. M.P.H., Ph.D., Dr.P.H., M.D., D.V.M.) having taken at least one course in epidemiology and one course in (bio)statistics during graduate/professional school, or persons with significant experience working in public health. The primary selection criteria include a demonstrated interest in and the ability to practice epidemiology in Florida public health agencies. Applications are being accepted from December 3, 2007 through February 29, 2008. Further information about the application process can be viewed on the program's website at: http://www.doh.state.fl.us/disease_ctrl/epi/FLEIS/ApplicantQual.htm/.

Recruitment for preceptor host sites will begin in early January 2008 with a letter that will be sent out to all county health department directors/administrators. The primary qualifications to serve as a host site include:

- A stimulating learning environment in which the fellow will have experienced epidemiologist role models and guides as they begin an epidemiology and public health career.
- A good understanding by supervisors of the core activities of learning (CALs) of the FL-EIS Program.

- Well-defined, appropriate epidemiologic projects that assignees can start as soon as they arrive at their assignment.

Additional information is available on the website listed above. Instructions on submitting a proposal to serve as a host site will be provided in the January 2008 recruitment letter. Applications from both experienced and new preceptor host sites, as well as a consortium of health departments, are welcome.

The program is looking forward to hearing from interested fellow applicants and prospective preceptor host sites. If you have any questions, please feel free to call the FL-EIS Program Administrator, Dr. Patti Ragan, at 850.245.4406.

Patti Ragan is the administrator for the Florida Epidemic Intelligence Service in the Bureau of Epidemiology, DOH. She can be contacted at 850.245.4406, 850.528.5531 (cell), or by email at Patricia_Ragan@doh.state.fl.us.

Florida Year-to-Date Mosquito-Borne Disease Through November 24, 2007

Rebecca Shultz, M.P.H.; Caroline Collins; Danielle Stanek, D.V.M.; Carina Blackmore, D.V.M., Ph.D.

During the period January 1-November 24, 2007, 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
Positive samples from 106 live wild birds, 92 sentinel chickens, 18 horses, and 1 antelope were received from 24 counties.

WNV Activity
Two human cases of locally acquired WNV encephalitis were confirmed in Bay County residents in August. One case of WNV encephalitis was confirmed in a resident of Pinellas County with travel history. This case was reported as a Florida case acquired out-of-state. Positive samples from 52 sentinel chickens were received from nine counties. In addition, samples from 13 live wild birds in four counties were found to be flavivirus-reactive (indeterminate for either SLEV or WNV antibodies).

SLEV Activity
Positive samples from five sentinel chickens were received from two counties.

HJV Activity
Positive samples from 15 sentinel chickens were received from six counties. In addition, virus was cultured from a mosquito pool (*Culiseta melanura)* collected in May in Flagler County.

CEV Activity
One case of La Crosse encephalitis was confirmed in a Hillsborough County resident with travel history. This case was reported as a Florida case acquired out-of-state. La Crosse virus is a member of the California encephalitis group of viruses. In addition, virus was detected in a mosquito pool *(Anopholes crucians)* collected in March in Sarasota 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 1, 991 reports representing a total of 4,425 dead birds (50 crows, 55 jays, 87 raptors, 4,233 other species) were received from 59 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/.

Year-to-Date Summary
Since January 1, 24 counties have reported EEEV activity, 12 have reported WNV activity (or undetermined flavivirus) activity, two have reported SLEV activity, seven have reported HJV activity, and one has reported CEV activity. Bay County is under a medical alert for mosquito-borne illness. Nassau County is also under a medical advisory for mosquito-borne illness, due to exceeding the response plan's trigger level for seroconversion rates in chickens.

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.

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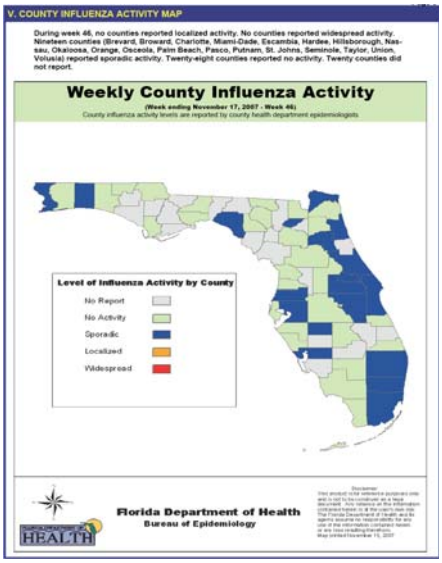
Florida Influenza Surveillance Report

Kate Goodin, M.P.H., Kateesha McConnell, M.P.H.

Influenza surveillance in Florida consists of six surveillance components: 1) Florida Sentinel Physician 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; and 6) Influenza or influenza-like illness (ILI) outbreaks. During reporting weeks 43, 44, and 45, statewide influenza activity was localized; during week 46 statewide influenza activity was sporadic. The proportion of patient visits for ILI as reported by the FSPISN averaged 1.41% for these four weeks, and this is below the state threshold for moderate activity of 1.75%. Since September 30, 2007, Florida Department of Health Laboratories have tested a total of 53 specimens for influenza viruses and 12 (23%) were positive. Among the 12 influenza viruses, 8 (67%) were influenza A viruses and 4 (33%) were influenza B viruses. During week 46, no counties reported localized activity. Nineteen counties reported sporadic activity. Twenty-eight counties reported no activity. Twenty counties did not report.

The report is available on EpiCom and on the Bureau of Epidemiology website: http://www.doh.state.fl.us/disease_ctrl/epi/htopics/flu/reports.htm.



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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.

This Month on EpiCom

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:

- Brucellosis investigation, Brevard County,
- Cryptosporidiosis outbreak in a day care, Clay County.
- Cluster of *Staphylococcus aureus* skin infections in a Volusia County school.
- Suspected foodborne outbreak at an anniversary luncheon, Broward County.
- Norovirus outbreak in a Duval County Nursing Home.
- Rash Illness, Citrus County.
- General Mills Operations recalls frozen meat pizzas due to possible *E. coli* O157:H7 contamination.
- *Mycoplasma pneumoniae* outbreak in a private school, Duval County.
- Cargill Meat Solutions Corp. voluntarily recalled approximately 1,084,384 million pounds of ground beef products, possible contamination with *E. coli.*
- Naval recruit, 18, hospitalized with a positive *N. meningitis* blood culture, Escambia County.
- Possible meningococcal meningitis, Holmes County.
- Meningitis cases of undetermined etiology in two women post epidural administration of pain medication, St. Lucie County.
- Presumed clinical diagnosis of tetanus in a 62-year-old female, Hillsborough County.
- Double B Foods, Inc. voluntarily recalled approximately 98,000 pounds of frozen sausage roll products, possible contamination with *Listeria monocytogenes.*
- Two unrelated cases of typhoid fever investigated, Palm Beach County.
- Suspected bacterial meningitis case in an 11-year-old girl, Homes County.
- The Florida DOH is working with the CDC to identify cases related to an outbreak of possible turtle-associated *Salmonella paratyphi* B var. Java.

- Del Rey Tortilleria, Inc. recalled its flour tortilla products due to a connection between the tortillas and recent illnesses in Racine, WI schools.
- Harmful Gulf of Mexico algal blooms have been identified.
- Lead Paint Standard violations and recalls online: http://www.doh.state.fl.us/environment/community/lead/The_Lead_Alert_Network.htm.

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/2007/November2007EpiUpdate.pdf.*

For submission guidelines or questions regarding Epi Update, please contact Gail Morales, Communications Coordinator, Bureau of Epidemiology. She can be contacted at 850.245.4444, Ext. 2401, or by email at Gail_Morales@doh.state.fl.us.

The Bureau of Epidemiology is a part of the Division of Disease Control
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