January 2007 volume 01

Infectious Disease Outbreak Newsletter

Georgia Infectious Disease Outbreak Summary -2006

INTRODUCTION

The Georgia Division of Public Health (GDPH), in accordance with the Official Code of Georgia, Title 31–12–1, is "…empowered to conduct studies, research, and training appropriate to the prevention of disease…." All physicians, laboratorians, and other healthcare providers are required by law to report any cluster of illnesses to their County Health Department or District Health Office immediately. The Notifiable Diseases Epidemiology Section (NDES) located at 2 Peachtree N.W. Atlanta, is responsible for supporting the District Epidemiologists in outbreak investigations, coordinating clinical and environmental specimen testing at the Georgia Public Health Laboratory (GPHL), and managing statewide outbreak-related data. NDES epidemiologists also work closely with the Centers for Disease Control and Prevention (CDC), the Georgia Department of Agriculture, and the Food and Drug Administration for technical support and collaboration on multistate investigations.

WHAT IS AN OUTBREAK?

An outbreak is defined as more cases of disease in time or place than expected. If the condition is rare (i.e. foodborne botulism) or has serious public health implications (i.e. bioterrorism agent), an outbreak may involve only one case. When two or more cases have the same laboratory diagnosis of the etiologic agent, the outbreak is considered laboratory-confirmed. A cluster is a group of cases in a certain place and time *suspected* to be greater than expected. Not all clusters are outbreaks but all clusters should be investigated thoroughly and rapidly to rule out an outbreak or to implement control measures. If the exposure takes place outside the state, it's not considered a Georgia outbreak. Georgia epidemiologists are responsible for outbreak investigations involving Georgia residents regardless of the exposure location. Outbreaks involving residents from multiple states are usually coordinated by CDC.

Investigations into the source of an outbreak or cluster can vary with the etiology involved (viral, bacterial, parasitic, or chemical), the mode of transmission (foodborne, waterborne, environmental, person-to-person), or the setting (restaurant, nursing home, school, community). Public Health professionals have a responsibility to respond in a timely manner, fully investigate the increase in cases, and stop or prevent further disease. All outbreaks should be investigated in a standardized way, according to the ten steps in an outbreak investigation (Figure 1).

Figure 1. OUTBREAK INVESTIGATION 10 STEPS

1. **Prepare to investigate**
   a. Identify outbreak investigation team
   b. Review scientific literature
   c. Notify appropriate state and local entities
   d. Determine if immediate control measures are needed
2. **Verify the diagnosis and confirm outbreak**
   a. Get laboratory confirmation
   b. Collect stool specimens from ill persons
   c. Perform bacteriologic, virologic or parasitic testing at the Georgia Public Health Laboratory (GPHL)
   d. Link patients and environmental specimens by DNA fingerprinting/Pulse Field Gel Electrophoresis (PFGE)
3. **Case definition**
   a. Establish a set of standard criteria for deciding who are the ill persons related to the outbreak ("case-patients")
   b. Narrow or broad (confirm, probable, suspect)
   c. DYNAMIC: may change during investigation
4. **Case finding**
   a. Conduct systematic search based on case definition
   b. Create line list of possible cases (people exposed)
5. **Perform descriptive epidemiology**
   a. Tabulate and orient data: PERSON, PLACE, TIME
   b. Frequencies
   c. Mapping
   d. Epidemic curve
6. **Hypothesis generation—the how and the why**
   a. Compare with known sources or similar outbreaks
   b. Design questionnaire
7. **Evaluate hypothesis thorough statistics**
   a. Perform epidemiologic study: cohort, case-control
   b. Compare risk factors among ill (cases) vs not ill (controls)
8. **Additional environmental studies**
   a. Collect food, water, and/or environmental samples
   b. Determine what happened with the implicated source or food
9. **Implement control/prevention measure**
   a. Coordinate with all stakeholders including regulatory partners
   b. Develop strategies to prevent further or future illness
10. **Communicate findings**
    a. Disseminate outbreak investigation report—internal and external audience
    b. Educate community, ill persons, restaurant staff, and Public Health staff

WHAT IS A FOODBORNE OUTBREAK?

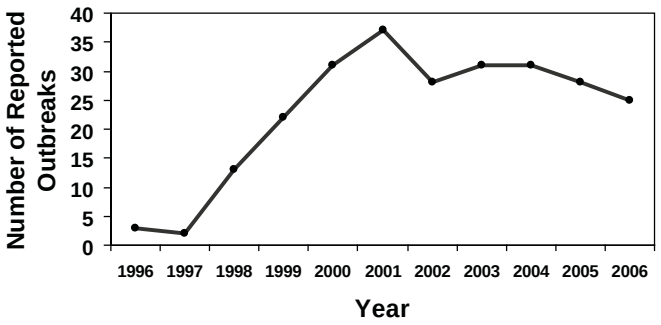
A foodborne outbreak is defined as two or more cases of a similar illness after ingestion of a common food or beverage *or* ingestion of food or beverages at a common meal or event. The definition of a laboratory-confirmed foodborne outbreak depends on the pathogen but usually requires two or more cases with the same laboratory diagnosis or identification of the etiologic agent in *epidemiologically* implicated food.

Four clues can be used to help determine the etiology (i.e. viral, bacterial, or bacterial toxin) of a foodborne outbreak: incubation period, duration of illness, frequency of clinical symptoms, and the population involved. (Figure 2) The epidemiologic and environmental investigations are driven by the suspect etiology along with knowledge of the organism's natural history (reservoir, vehicle) and food microbiology (contamination, survival, growth). By understanding where and how the organism persists in nature and in food, these clues can point to not only the outbreak's etiologic agent but the source of transmission.

Figure 2. Four Clues to Determine the Etiology of a Foodborne Outbreak

1. **Incubation period**
   a. Very rapid (hours)—TOXIN
   b. Approximately a day—VIRAL
   c. Several days—BACTERIAL
2. **Duration of illness**
   a. Short duration—VIRAL or TOXIN
   b. Long duration—BACTERIAL
3. **Predominate clinical symptoms**
   a. Diarrhea—VIRAL or BACTERIAL
   b. Vomiting—TOXIN
   c. Severe disease—BACTERIAL
4. **Population involved in the outbreak**
   a. Institutions—VIRAL
   b. Large catered events—TOXIN or VIRAL

Figure 3. Number of Reported Foodborne Outbreaks—Georgia, 1996–2006



GEORGIA OUTBREAKS DURING 2006

NDES received 179 reports of outbreaks or clusters in 2006. Ninety-nine were later confirmed as Georgia outbreaks (Table 1). Norovirus was the most commonly identified etiology (58/99; 59%) and 59% (34/58) were laboratory-confirmed. The majority of norovirus outbreaks in Georgia took place in nursing homes (36/58; 62%). Of the total confirmed Georgia outbreaks, District Epidemiologists reported 78 (79%) and 57 (58%) were laboratory-confirmed. Only twenty-three (23%) Georgia outbreaks were foodborne with laboratory-confirmed etiology in nine (39%). Any suspect Georgia outbreak or cluster should be reported to Cindy Burnett, Outbreak Coordinator, NDES or Carrie Shuler, Medical Epidemiologist, NDES.

OUTBREAK SPOTLIGHT

Botulism Associated with Commercial Carrot Juice—Georgia, September 2006 [previous report published in the MMWR October 6, 2006 / 55[Dispatch];1-2)

On September 8, three patients from Washington County, Georgia, went to a local hospital with cranial nerve palsies, progressive descending flaccid paralysis and subsequent respiratory failure. The patients had shared meals on September 7. On the evening of September 8, physicians suspected foodborne botulism, notified the state health department, and collected clinical specimens for testing at CDC. On the same evening, CDC provided clinical consultation and dispatched botulinum antitoxin, which was administered to each of the patients the following morning. After receiving antitoxin, the patients had no progression of neurologic symptoms, but they remain hospitalized and on ventilators.

On September 9, the Washington County Health Department, East Central Health District and GDPH launched an investigation. The three patients had consumed several food items during their two meals together on September 7, including juice from a single 1-liter bottle of Bolthouse Farms carrot juice. Clinical specimens, leftover food and juice were collected and sent to CDC for testing. On September 13, botulinum toxin type A was identified in the serum and stool of all three patients. On September 15, leftover carrot juice recovered from the home of one of the patients also tested positive for botulinum toxin type A.

During September 8–15, FDA, the Georgia Department of Agriculture, the Georgia Hospital Association, and public health officials in all 50 states were notified of the outbreak and the implicated product as information became available. After these notifications, no additional cases of botulism in Georgia were reported. During this time, FDA launched an investigation of the Bolthouse Farms, Inc., manufacturing plant in Bakersfield, California. FDA and CDC tested other bottles of the implicated brand of carrot juice, including bottles from different lots, and all were negative for botulinum toxin. On September 17, FDA issued a consumer advisory on the importance of keeping carrot juice refrigerated. However, information obtained from patient interviews regarding storage and transport of the carrot juice did not identify mishandling by the patients.

C. botulinum spores are found in the environment and can be present naturally in carrot juice and other foods that have not undergone the retort canning process, which involves high temperatures and high pressure. Anaerobic conditions, low acidity (pH>4.6), low salt and sugar concentrations, and temperatures >39°F (>4°C) promote germination of *C. botulinum* spores and botulinum toxin production. Carrot juice has low acidity, with a natural pH of approximately 6.0; therefore, in the absence of another inhibitor, refrigeration at temperatures <40°F (<4°C) is necessary to prevent germination of *C. botulinum* spores and production of botulinum toxin.

The carrot juice consumed by these patients was manufactured by Bolthouse Farms, Inc., and distributed in all 50 states, Mexico, Canada, and Hong Kong. On September 29, following a report of an additional carrot juice related botulism case in Florida, GDPH and the Georgia Department of Agriculture recommended that Georgia residents not purchase or consume Bolthouse Farms carrot juice. The same day, the FDA warned consumers not to drink Bolthouse Farms carrot juice with "best if used by" dates of November 11, 2006 or earlier (i.e., all bottles produced before the date the warning was issued), and Bolthouse Farms issued a voluntary recall of these products.

As of January 2007, one Georgia patient remains ventilated and in a hospitalized long term care facility. Bolthouse Farms Carrot Juice is back on the shelves in Georgia grocery stores. The juice is now injected with steam at 283° F for 3 seconds in order to ensure a 12 log reduction in *Clostridium* spores. The product is not considered aseptic. The manufacturer ensures the safety of their product but continues to stress that refrigeration is required at all times.

Suspected botulism cases should be reported immediately to local or state public health officials; the Epidemiology Branch will call the 24-hour CDC Emergency Operations Center at 770-488-7100 to coordinate clinical consultation and possible distribution of botulism antitoxin; the center will immediately connect them with an on-call botulism specialist. Additional information on botulism is available at http://www.cdc.gov/ncidod/dbmd/diseaseinfo/botulism_g.htm.

Outbreak investigation team: German Gonzalez, Jason Smith, District 5.2 North Central Health District; Joy Miller, District 6.0 East Central Health District; Petra Weirsma, Carrie Shuler, Cindy Burnett, Julie Gabel, Melissa Tobin-D'Angelo, Cherie Drenzek, Susan Lance, NDES.

Georgia *Salmonella* serotype Montevideo Investigation—Valdosta, Georgia, September–October 2006

On September 13, the Notifiable Diseases Epidemiology Section (NDES) initiated an investigation of an increase in reported *Salmonella* Montevideo infections in the Valdosta, Georgia area. The Georgia Public Health Laboratory (GPHL) performed Pulse-Field Gel Electrophoresis (PFGE) and found that most of the *S*. Montevideo isolates tested since August 2006 had a PFGE pattern not previously identified in Georgia. This *Salmonella* strain (GASMVX0038/JIXX01.0011) was classified as the "outbreak strain" for the purposes of the investigation.

Seventy-two case-patients with the outbreak strain of *S*. Montevideo were identified. Lab collection dates ranged from September 1 to November 15, 2006. Investigators interviewed 52 (72%) case-patients. Of these, 43 (82%) reported that they most likely ate at Restaurant A in Valdosta in the seven days before their illness onset, four (8%) were unsure if they ate at Restaurant A but often eat fast food in Valdosta, and five (10%) did not eat at Restaurant A in the 7 days before illness onset.

On October 20, 2006, investigators from NDES, the South Georgia Health District, and the Lowndes County Environmental Health Department visited Restaurant A to evaluate the possibility of a continuous environmental source of *Salmonella* contamination. Investigators collected ten swab samples from environmental surfaces in the restaurant and delivered them to GPHL on October 23 for *Salmonella* testing.

On October 25, GPHL reported that a swab sample collected from a meat slicer at Restaurant A was positive for *Salmonella* (later confirmed to be the outbreak strain of *S*. Montevideo). Local Environmental Health Specialists immediately visited the restaurant and removed the meat slicer from service. Investigators collected an additional 31 food and environmental samples. Of these, two tested positive for the outbreak strain of *Salmonella*: roast beef collected from a sandwich and a swab collected from the blade cover of the same slicer found to be contaminated on October 20. All food in the restaurant that may have come into contact with the meat slicer was discarded on October 25.

Investigators are continuing to monitor reported cases of *Salmonella* infection to determine the effectiveness of control measures. As of January 2007, no cases of *S*. Montevideo associated with exposure to the Restaurant A after October 25, 2006 have been identified.

Outbreak investigation team: Geneine Godfrey, Courtney Sheeley, Andy Johnson, Leslie Golden, Tad Williams, District 8.1 South Health District; Carrie Shuler, Cindy Burnett, Petra Weirsma, Cherie Drenzek, NDES; Georgia Public Health Laboratory, Microbiology/Bacteriology.

Walker County Pertussis Outbreak, November 2006

On November 16, 2006, the Northwest Health District Epidemiology staff received a report of a positive pertussis polymerase chain reaction (PCR) assay in a 10-month-old Walker County infant; the diagnosis was later culture-confirmed as pertussis infection. An investigation was initiated to determine the scope of the outbreak, and identify close contacts for testing and antibiotic prophylaxis.

Investigators found that the infant's grandfather, grandmother, and mother also had symptoms of pertussis and were treated with antibiotics. The infant's mother had positive pertussis culture and PCR assay results. The family attended a local church where investigators found 32 members with cough illnesses of varying severity. Symptom onset ranged from late August to early December. One of the symptomatic church members was a registered nurse who worked at a dialysis center. Because of the potential risk to dialysis patients, GDPH epidemiologists

recommended antimicrobial prophylaxis for all staff and patients of the dialysis center. The dialysis center provided antibiotics for 60 patients and 50 staff members and made the pertussis booster vaccine, Tdap, available for susceptible persons.

Pertussis is challenging to investigate because identification of cases can be difficult, particularly in adolescent and adult populations in which symptoms may resemble the common cold. Adolescents and adults have waning immunity and therefore can facilitate spread of pertussis to unimmunized or under-immunized infants. The investigation revealed that a number of children in the church congregation were not up-to-date with their vaccinations or had no history of immunizations. The first confirmed case in the outbreak, a 10-month old infant, had no history of vaccinations for pertussis.

If pertussis is highly suspected or confirmed, household and high-risk contacts should be identified and prophylaxis recommended, regardless of age and vaccination status. Investigators need to assure that all children involved in an outbreak have received 4 doses of the DTaP vaccine, with the first three doses administered at 4 week intervals beginning at 8 weeks of age. The fourth dose should be given at 15-18 months of age. Children under 7 years of age who are close contacts to a case, but have not received four doses of the DTaP vaccine should be given a dose as soon as possible. Other close contacts 11 years of age or older should follow-up with their healthcare provider to receive the Tdap booster vaccine. Surveillance for new cases associated with an outbreak should continue for at least 42 days after cough onset of the last case.

Outbreak investigation team: Debbie Abercrombie, Melissa Atkins, Aubrey Denmon, Scott Henson, Thelma House, Dennis Mitchell, District 1.1 Northwest Health District; Katie Arnold, Julie Gabel, Beth Ward, NDES.

Outbreak Newsletter | Edited by Carrie Shuler, DVM, MPH & Cindy Burnett, MPH
Notifiable Diseases Epidemiology Section
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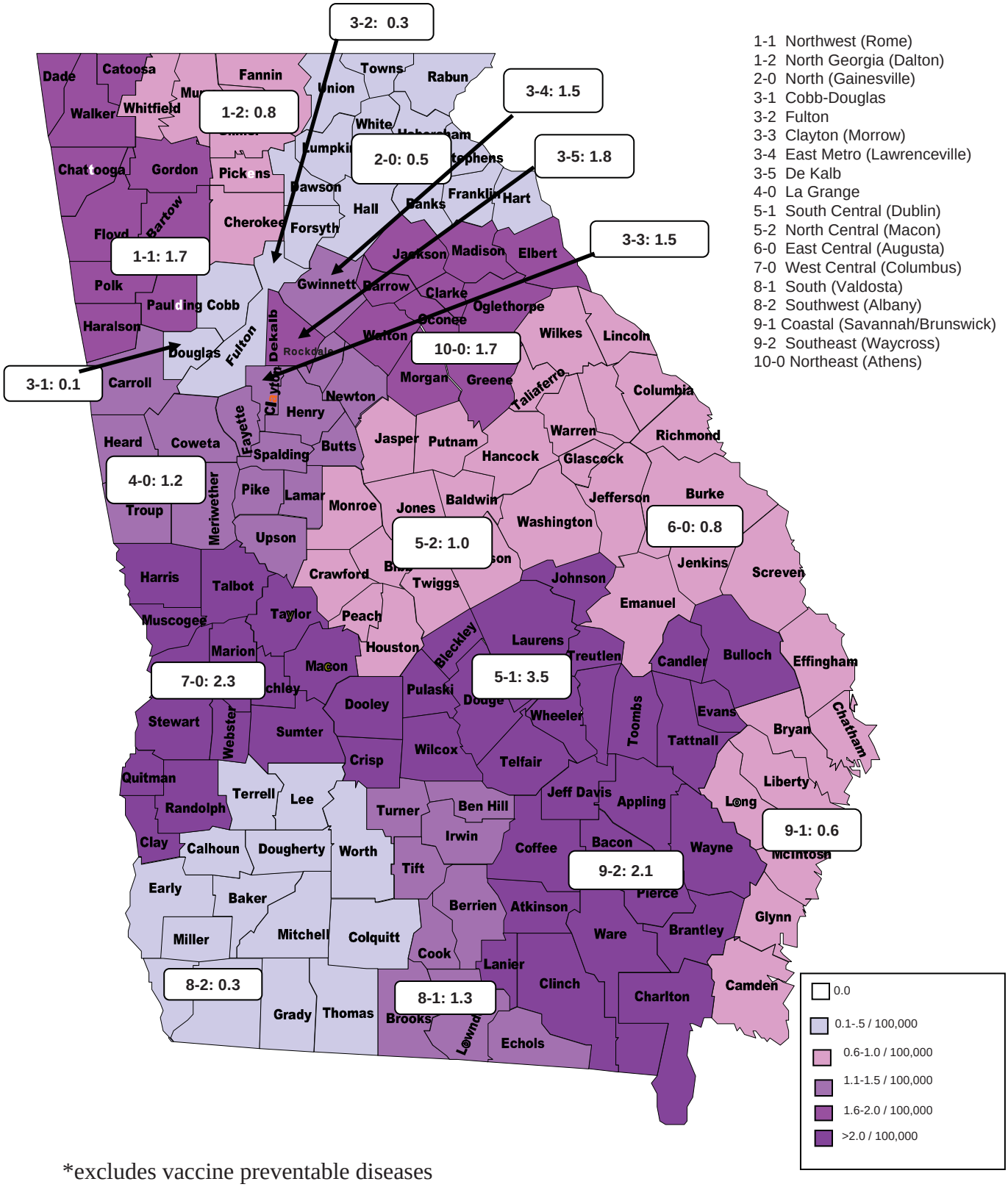
Table 1. Reported Infectious Disease Outbreaks* by Health District—Georgia, 2005–2006

Health District	Total Number of Georgia* Outbreaks		Total Number of Laboratory-Confirmed Outbreaks		Total Number of Reported Foodborne Outbreaks		Total Number of Norovirus Outbreaks	
	2005	2006	2005	2006	2005	2006	2005	2006
1.1: Rome	8	10	4	5	3	0	4	5
1.2: Dalton	2	3	2	2	1	1	2	1
2.0: Gainsville	5	3	3	1	2	0	0	2
3.1:Cobb-Douglas	3	1	2	1	1	0	1	1
3.2: Fulton	8	3	4	1	8	2	2	1
3.3: Clayton	0	4	0	0	0	2	0	2
3.4: Gwinnett	7	11	3	3	4	6	3	6
3.5: DeKalb	9	12	8	7	2	5	4	8
4.0: LeGrange	4	9	2	6	1	2	1	4
5.1: Dublin	7	5	6	5	0	0	6	4
5.2: Macon	6	5	3	5	0	1	0	2
6.0: Augusta	2	4	2	1	1	0	0	2
7.0: Columbus	11	8	4	6	4	1	4	6
8.1: Valdosta	2	3	0	2	1	1	1	1
8.2: Albany	8	1	7	1	0	0	4	1
9.1: Coastal	3	3	1	2	0	0	0	1
9.2: Waycross	0	7	0	5	0	1	0	5
10.0:Athens	1	7	1	4	0	1	1	6
Total	86	99	52	57	28	23	33	58

*excludes vaccine preventable diseases, injury, and environmental

Rates of Reported Georgia Infectious Disease Outbreaks* per 100,000 Population, 2006



*excludes vaccine preventable diseases