



# Infectious Disease Outbreak Newsletter

## Outbreaks in School and Childcare Settings

### Infectious Diseases in School and Childcare Settings

Infectious disease organisms that are spread from person-to-person or into the environment can lead to outbreaks in school and childcare settings. It is vital that parents, school nurses, childcare staff and Public Health communicate about potential outbreak situations involving children. Instituting basic prevention measures can quickly halt an outbreak and provide an opportunity to educate at-risk populations about how to prevent future illnesses.

Infectious diseases can spread among children in schools and childcare centers in multiple ways. Diseases with respiratory symptoms such as influenza, chickenpox, meningitis, strep throat, and pertussis can spread through coughing, sneezing or talking. Diseases with gastrointestinal symptoms (diarrhea, vomiting, and nausea) can be transmitted directly from one person to another or through food or other fomites. Organisms that can cause outbreaks of gastrointestinal disease include norovirus, *Shigella*, *Salmonella*, *Campylobacter*, *Cryptosporidium*, *E.coli 0157:H7*, *Giardia*, and hepatitis A. If proper handwashing is not practiced, hands contaminated with feces can pass infectious organisms to toys, tabletops, doors, faucets, and toilet handles. Ill food handlers can also serve as human reservoirs for the highly contagious pathogens *Shigella* and norovirus, which can be spread through food in school settings. In the United States, during the period from 1973 to 1997, 50,000 illnesses were associated with foodborne disease outbreaks in schools.<sup>1</sup> Other routes of infectious disease transmission in school or childcare settings include skin-to-skin contact or indirect contact with contaminated clothing. Chickenpox (varicella), impetigo, Methicillin-resistant *Staphylococcus aureus* (MRSA) skin infections, head lice, ringworm, and scabies can be passed from one student to another via these routes. All clusters or outbreaks of infectious disease are reportable by law to Public Health, no matter the etiology.

The basic principles of infectious disease outbreak prevention and control can be applied to school and childcare settings. Prompt detection, investigation, and control of an outbreak will not only result in fewer illnesses among students and school employees, but may stop the outbreak from spreading into the larger community. Prevention of disease transmission through good handwashing policies for both students and staff should be constantly re-enforced. Keeping the school environment clean and sanitized, especially in food preparation and eating areas, is crucial. It is also critical to educate school employees about the importance of infection control practices. School and childcare administrations should have policies in place for handling a sick child or staff member. Parents need to understand the importance of excluding their child from school or childcare when ill.

Any cluster of illnesses, regardless of the cause, must be reported to Public Health immediately. Establishing good lines of communication and collaborative relationships with local schools and childcare centers prior to an outbreak will result in faster reporting and resolution of an outbreak. Infectious disease outbreaks can be quickly minimized through diligent investigation, communication, and education.

### INFECTIOUS DISEASES IN SCHOOLS AND CHILDCARE SETTINGS<sup>2,3</sup>

#### Gastrointestinal Diseases/Fecal→Oral Transmission:

**Campylobacteriosis**

**Cryptosporidiosis**

***E.coli 0157:H7***

**Giardiasis**

Hand, Foot and Mouth Disease

**Hepatitis A\***

**Meningitis (viral)**

**Salmonellosis**

**Shigellosis** (text box)

Norovirus infection

#### Respiratory Diseases/Droplet and Airborne Transmission:

Chickenpox (Varicella)\* (text box)

Common cold

Fifth Disease

Hand, Foot, and Mouth Disease

Influenza\* (text box)

**Measles\***

**Meningitis (viral and bacterial)**

**Mumps\***

Respiratory Syncytial Virus (RSV)

**Rubella\***

**Tuberculosis**

#### Skin/Rash Diseases/ Skin or Direct Contact:

Chickenpox (Varicella)\* (text box)

Head lice (Pediculosis)

Impetigo

Methicillin-Resistant *Staphylococcus aureus* (MRSA) (text box)

Ringworm

Scabies

Georgia Notifiable Diseases in **Bold**

\*Vaccine Preventable

### Guidelines for the Identification and Control of Chickenpox (Varicella) Outbreaks in School and Childcare Settings<sup>2,3,4</sup>

**Mode of Transmission:** Spread by close contact with secretions from the nose, throat, or rash from an infected person

**Incubation Period:** Usually 14–16 days from exposure

**Period of Communicability:** 1–2 days before until 5 days after rash onset

**Clinical Presentation:**

- *Primary varicella infection in unvaccinated persons*
  - Generalized rash with 200+ maculopapular-vesicular lesions
- *Breakthrough chickenpox in vaccinated persons*
  - Generalized rash (less than 50 lesions) and maculopapular lesions
  - Low grade or no fever
  - Short duration of illness

**Cluster/Outbreak Definitions:** 5 or more associated cases of varicella occurring over a 6 week time period

**Action Steps for Outbreak Investigation in the School Setting**

1. Notify and collaborate with Public Health.
2. Identify then exclude all varicella cases (primary and breakthrough) until all lesions are crusted or rash is gone (usually 5 days).
3. Exclude all susceptible students and staff (unvaccinated for any reason, i.e. medical or religious exemptions or immunocompromised) from school. Public Health and school officials will determine the time of exclusion on a case-by-case basis.
4. Refer students who are susceptible and have no contraindications to their healthcare provider for varicella immunization.
5. Compile a list of affected students and staff by classroom.
6. Obtain specimens for laboratory confirmation. **Submission of specimens should be coordinated with Public Health.**
7. Communicate with parents about the outbreak via a letter.
8. Maintain accurate, accessible, and current immunization records on all students.

**During 2007 (through September), 9 school or childcare-related varicella outbreaks were reported to Public Health in Georgia.**

### Guidelines for the Identification and Control of Influenza Outbreaks in School and Childcare Settings<sup>2,3</sup>

**Mode of Transmission:** Spread person-to-person through droplets and infectious discharges, and tends to occur in noticeable epidemics

**Incubation Period:** 1–4 days

**Period of Communicability:** 3–4 days

**Clinical Presentation:**

- Upper respiratory infection with fever and cough or sore throat
- Nausea and vomiting can occur with children

**Cluster/Outbreak Definitions/Reporting Recommendations:**

- Significant increases in influenza-like illness related absenteeism
- Influenza-associated death in a child  $\leq 18$  y/o

**Action Steps for Outbreak Investigation in the School Setting**

1. Notify and collaborate with Public Health.
2. Identify and confirm etiology through rapid tests at healthcare providers, if possible.
3. Obtain nasopharyngeal or throat swab specimens from 3 or more suspect influenza case-patients for laboratory confirmation; coordinate with Public Health and GPHL.
4. Compile a list of affected students and staff by classroom.
5. Ill children and staff should be excluded until 24 hours fever-free.
6. Recommend students and staff receive influenza vaccine, especially if the outbreak occurs early in the influenza season.
7. Communicate with parents about the outbreak via a letter.
8. Maintain accurate, accessible, and current immunization records on all students.

**Two school or childcare-related influenza outbreaks were reported to Public Health during the 2006–2007 influenza season.**

### Guidelines for the Identification and Control of *Shigella* Outbreaks in School and Childcare Settings<sup>2,3</sup>

**Mode of Transmission:** Spread person-to-person (fecal-oral) through contact with infected people, by coming in contact with contaminated surfaces, or by eating food/water contaminated by infected persons.

**Incubation Period:** 1–7 days (usually 1–3 days)

**Period of Communicability:** Variable, (1–4 weeks) if untreated

**Clinical Presentation:**

- Diarrhea +/- blood or mucus
- Fever
- Vomiting
- Abdominal cramps

**Cluster/Outbreak Definitions:**

- Individual cases are reportable to Public Health within 7 days
- At least 2 children with symptoms suggestive of shigellosis with at least 1 culture confirmed case associated with same school setting

**Action Steps for Outbreak Investigation in the School Setting**

1. Notify and collaborate with Public Health.
2. Send a letter to parents. Include information on symptoms, mode of transmission, illness reporting, and importance of handwashing and disinfection.
3. Exclude children or staff who are having symptoms consistent with shigellosis (diarrhea) until they are asymptomatic, refer them to their healthcare provider, and instruct them to submit a stool specimen or rectal swab for testing.
4. Conduct surveillance for cases of diarrheal illness in affected schools.
5. Compile a list of affected students and staff by classroom.
6. Exclude culture-positive diapered children and foodhandlers until they have had two negative stool cultures 48 hours after completing any prescribed antibiotics.
7. Discourage transfers to other schools or childcare centers. Prohibit new enrollment until the infection has been eliminated from the facility.
8. Cohort children (if necessary to control outbreak) that are culture-positive and under treatment.
9. Educate staff on proper hand hygiene and environmental disinfection.
10. Make regular visits to the school or childcare center to verify that procedures are being followed and outbreak is under control.
11. More information available at <http://health.state.ga.us/pdfs/epi/gers/Feb07GER.pdf>.

**During 2007 (through September), 33 school or childcare-related *Shigella* outbreaks were reported to Public Health in Georgia.**

### Guidelines for the Identification and Control of MRSA Skin and Soft Tissue Infection Outbreaks in School and Childcare Settings<sup>2,3,6</sup>

**Mode of Transmission:** Person-to-person through direct contact with the hands, skin drainage, or secretions from the nose of a person who is infected or colonized.

**Incubation Period:** Variable, 1-10 days

**Period of Communicability:** Active non-treated drainage is infectious.

**Clinical Presentation:**

- Skin infections: folliculitis, abscesses, furuncles (“boils”), and carbuncles, often with purulent drainage
- More severe presentation: pneumonia, sepsis, endocarditis

**Cluster/Outbreak Definitions/Reporting Recommendations:**

- 2 or more cases of active disease in the same school or childcare setting
- Confirmed MRSA infection resulting in death or severe disease (sterile site) infection, ICU care, or requiring major surgery

**Action Steps for Outbreak Investigation in the School Setting**

1. Notify and collaborate with Public Health.
2. Compile a list of affected students and staff by classroom.
3. Advise student/staff to visit a healthcare provider.
4. Recommend culture to guide individual therapy and to assess local disease trends and resistance patterns.
5. Communicate with parents about the outbreak via a letter.
6. Exclude children from school if the wounds cannot be covered, contained or dressing maintained intact and dry.
7. Children known to be colonized with MRSA in the nose or skin do not need to be excluded from the “healthy” school/childcare classroom.
8. Educate student and staff on hand hygiene and safe dressing disposal. Advise student/staff not to share towels, bar soap, or other personal hygiene items. Disinfect potentially contaminated surfaces that contact bare skin.
9. More information available at <http://health.state.ga.us/mrsa/>.

**During 2007 (through September), 5 school or childcare-related MRSA outbreaks were reported to Public Health in Georgia.**

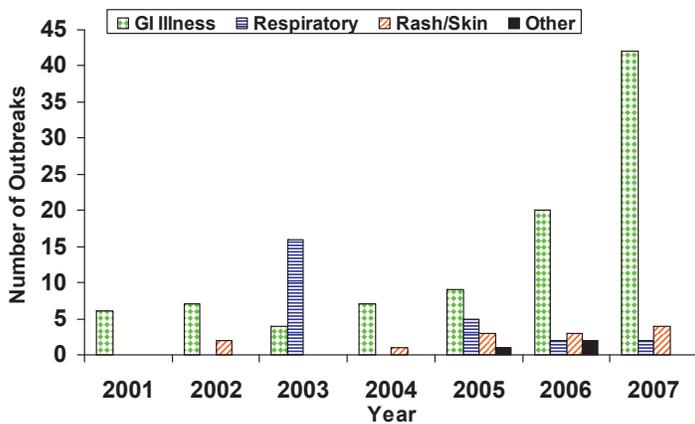
**References:**

- <sup>1</sup> Daniels NA, MacKinnon L, Rowe SM, et al. Foodborne disease outbreaks in United States schools. *Pediatric Infection Disease Journal* 2002;21(7):623-628.
- <sup>2</sup> Colorado Department of Public Health and Environment. Infectious disease in school settings: guidelines for school nurses and personnel. Dec 2004. Available at [http://www.cdphe.state.co.us/dc/Epidemiology/manual/School\\_Guidelines.pdf](http://www.cdphe.state.co.us/dc/Epidemiology/manual/School_Guidelines.pdf)
- <sup>3</sup> Infection Control in the Child Care Center and Preschool. Sixth Edition. Grossman, Leigh ed. Lippincott Williams and Wilkins New York. 2003.
- <sup>4</sup> Adapted from the Rhode Island Department of Health Guidelines for the Prevention and Control of Varicella (Chickenpox) Outbreaks in Day Care, Preschools, Schools, Colleges, and Universities and the Pink Book, 9<sup>th</sup> ed.
- <sup>5</sup> Centers for Disease Control and Prevention. Recommendations of the Advisory Committee on Immunization Practices (ACIP): Prevention of Varicella. *MMWR* 2007; 56(RR-4):1-39.
- <sup>6</sup> Georgia MRSA Task Force, Georgia DHR Division of Public Health, GUARD Coalition. 2006 Georgia Guidelines for Management of Suspected Community-Acquired Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA) Skin and Soft Tissue Infections (SSTIs). October 2006.

**GEORGIA SCHOOL OR CHILDCARE-ASSOCIATED OUTBREAKS, 2001–2007**

During 2001 through September 2007, 133 outbreaks associated with a school or childcare center were reported to Notifiable Diseases Epidemiology Section (NDES). Ninety-one (68%) were confirmed as Georgia outbreaks. *Shigella* and norovirus were the most commonly identified etiologic agents, with 40 (30%) outbreaks and 25 (19%) outbreaks reported, respectively. Ninety-five (72%) of the outbreaks reported during this time period involved gastrointestinal symptoms, 25 (19%) were respiratory, 13 (10%) were rashes or involved the skin, and three were classified as other (fainting, mononucleosis, and unknown) (Figure 1).

**Figure 1. Number of Outbreaks Involving Schools or childcare Centers, by Symptom Type, Georgia, 2001–September 2007**



**GEORGIA INFECTIOUS DISEASE OUTBREAKS TOTALS, 3<sup>rd</sup> QUARTER: JULY–SEPTEMBER, 2007**

The Notifiable Diseases Epidemiology Section (NDES) received 44 reports of outbreaks or clusters occurring during the third quarter of 2007. Sixteen (36%) were later confirmed as Georgia outbreaks (Table 1). *Shigella* was the most commonly identified etiology (3/16; 19%) and 100% (3/3) of these were laboratory-confirmed. Of the total confirmed Georgia outbreaks during the third quarter of 2007, District Epidemiologists reported 9 (56%) and 14 (88%) were laboratory-confirmed. During the third quarter of 2007, only 6 (4%) outbreaks were foodborne, with the etiology being laboratory-confirmed in 4 (67%). *Salmonella* was the most common etiology among foodborne outbreaks [3/6 (50%)].

Any suspect outbreak or cluster investigated in Georgia should be reported to Cindy Burnett, Outbreak Coordinator, NDES, or Carrie Shuler, Medical Epidemiologist, NDES.

**INFECTIOUS DISEASE OUTBREAK SPOTLIGHTS**

**Outbreak of Shigellosis in a Childcare Center—Gwinnett County, Georgia, 2007**

On August 16, 2007, a laboratory-confirmed *Shigella sonnei* infection in a 3 year-old was reported to the East Metro Health District (EMHD) through the State Electronic Notifiable Disease Reporting System (SendSS). The parent of the child was interviewed by Public Health and was found to attend a Gwinnett County childcare center. The childcare center staff were notified and educated about the necessary hygiene measures for infection control; surveillance for illness in other children was also initiated. Thirty-four cases of shigellosis (18 culture-confirmed as *Shigella sonnei*) were found to be associated with the childcare center; illness onsets ranged from August 1 through September 3, 2007. Secondary transmission occurred within the childcare center and in the households of the ill children.

Public Health staff initiated the outbreak investigation at the childcare center on August 17, 2007. Epidemiologists noted that, at the center, restrooms and sinks (with soap and paper towels) were indeed available for children and staff. Childcare employees were instructed to mix a new 1:10 bleach solution on a daily basis for cleaning and disinfection of potentially contaminated surfaces, including toilet seats, sinks, faucets, diaper changing stations, etc. A letter was sent home to parents on childcare center letterhead describing the outbreak and to educate parents about what symptoms to watch for in their children. Parents were instructed to visit their healthcare provider if their children developed symptoms. A follow-up letter was sent on August 22, 2007, from the EMHD, detailing the investigation and the requirement that culture-positive children need two negative stool cultures before they would be allowed back into the center. The owner of the childcare center was notified of all culture-confirmed *Shigella* infections among center attendees to ensure compliance with the policy.

During the outbreak period, children participated in “Water Day” activities (including a water slide supplied by tap water) which may have facilitated spread of *Shigella* infections. Childcare center employees were educated

that while tap water is safe for drinking, the chlorination is not sufficient for outdoor water activities such as the water slide. It was recommended to not have water activities including pools, slides, etc. without proper chlorination.

Prompt recognition and investigation of *Shigella* cases by EMHD staff identified and minimized the outbreak. The Georgia Public Health Laboratory played a key role in performing cultures on stool specimens from children and staff involved in the investigation. Constant communication between childcare staff, EMHD epidemiologists, and the State Notifiable Disease Epidemiology Section was essential in controlling additional spread of disease.

Spotlight contributed by Alana Sulka, Director, Epidemiology and Community Health for East Metro Health District 3-4

**Acute Gastroenteritis Outbreak Associated with a Sandwich Catering Restaurant—Clayton and Fulton Counties, Georgia, 2007**

On August 21, 2007, an occupational health nurse from a Clayton County company (Company A) reported multiple ill employees that had attended company events on August 15, 16, and 17, 2007. All three events served food catered from a single Fulton County sandwich restaurant (Restaurant X). Company A event coordinators provided copies of Restaurant X invoices to estimate the number of persons exposed and the food items served. To elucidate risk factors for illness, a questionnaire was designed by NDES epidemiologists and disseminated to Company A employees online via our State Electronic Notifiable Disease Surveillance System (SendSS). Information about symptom onset date/time, type of symptoms, and an extensive food history were requested. A case-patient was defined as any person with acute gastrointestinal symptoms (diarrhea and/or vomiting) within three days of eating food at Restaurant X.

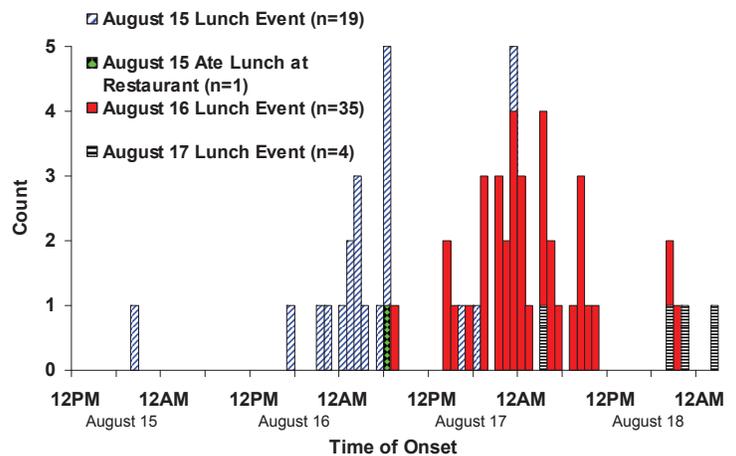
A total of 63 Company A employees completed the questionnaire. Respondents were from five different states (GA, NY, KY, FL, and HI) and seven different Georgia Health Districts (3.1, 3.2, 3.3, 3.4, 3.5, 4.0, and 1.2). Sixty case-patients were identified, including two persons that had not attended the catered events but ate lunch at Restaurant X on August 15, 2007. The majority of respondents were male (68%), of white race (62%), and with a median age of 45 years. No case-patients were hospitalized, only five visited their healthcare provider and no case-patients provided stool specimens for laboratory identification of the outbreak organism. Case-patients experienced diarrhea (93%), vomiting (80%) and abdominal cramping (62%) approximately 37 hours (range: 8-57 hours) after eating food from Restaurant X (Figure 2). Among case-patients, symptoms were experienced for a duration of 1 to 9 days (median 3 days).

On August 22, 2007, Fulton County Environmental Health Specialists conducted a complaint investigation at Restaurant X. To assess the possible contribution of ill foodhandlers, stool samples were collected from Restaurant X employees for testing at the Georgia Public Health Laboratory. Multiple critical violations were identified at Restaurant X, resulting in an overall health score of 54 out of 100. Equipment failed to maintain required food item temperatures, employees failed to have proper hygiene practices, and potentially hazardous foods including

roast beef, chicken salad, salami, and tuna did not meet temperature requirements. The employee that performed all sandwich-making duties during the outbreak week reportedly left work early on August 15, 2007, because of a “stomach infection”. He returned to work on August 16, 2007 and resumed his food handling responsibilities. On August 22, Restaurant X voluntarily closed to allow removal of food items and correction of critical violations. On August 24, 2007, Restaurant X was re-inspected, scored 95 out of 100 without any critical violations and was authorized to reopen. The stool specimens from the foodhandlers were negative for norovirus, *Salmonella*, *Shigella*, *Campylobacter*, *Aeromonas*, *ECO 157:H7*, and *Yersinia*.

Based on the symptoms, incubation period, duration, history of an ill food handler and hygiene practices at Restaurant X, we concluded that the infectious organism most likely involved with this outbreak was norovirus. Even though noroviruses can be shed in the stool of infected persons for up to 2 weeks, the laboratory techniques (EM and RT-PCR) can only reliably detect the organism in currently or recently symptomatic patients (within 4 to 7 days of diarrhea onset). Negative stool results obtained during this investigation do not rule-out the food handler as the source of norovirus infection for the ill Company A employees. Because norovirus is a human reservoir pathogen with a low infectious dose, poor hand hygiene prior to handling ready-to-eat foods can result in multiple food items contaminated and high attack rates for those exposed.

**Figure 2. Illness Onset Among Case-Patients, Fulton County Outbreak Investigation, Georgia, 2007 (n=59)\***



\* Onset date/time available for 59 of 60 case-patients

Outbreak investigation team: Beverly Lester, District Epidemiologist, Clayton County, Wayne Ford, District Epidemiologist, Fulton County, Lorraine McCall and Pearl Gordon, Environmental Health Specialists, Fulton County, Company A Occupational Health Nurse, Georgia Public Health Laboratory, Carrie Shuler, Medical Epidemiologist, Notifiable Disease Epidemiology Section.

Please visit our website for information on Georgia outbreaks: <http://health.state.ga.us/epi/outbreak/index.asp>.

**Table 1. Reported Infectious Disease Outbreaks\* by Health District—  
Georgia, 3<sup>rd</sup> Quarter, 2006 and 2007\*\***

Health District	Number of Outbreaks		Number of Laboratory-Confirmed Outbreaks		Number of Foodborne Outbreaks	
	2006	2007	2006	2007	2006	2007
1.1: Rome	3	1	1	1	0	0
1.2: Dalton	0	2	0	1	0	1
2.0: Gainesville	1	0	1	0	0	0
3.1: Cobb-Douglas	0	1	0	1	0	0
3.2: Fulton	1	0	1	0	1	0
3.3: Clayton	0	1	0	0	0	1
3.4: Gwinnett	3	1	0	1	2	0
3.5: DeKalb	1	1	1	1	1	0
4.0: LaGrange	3	0	3	0	0	0
5.1: Dublin	1	0	1	0	0	0
5.2: Macon	1	1	1	1	1	1
6.0: Augusta	0	0	0	0	0	0
7.0: Columbus	2	1	2	1	0	0
8.1: Valdosta	2	0	2	0	1	0
8.2: Albany	0	1	0	1	0	0
9.1: Coastal	1	4	0	4	0	1
9.2: Waycross	2	2	1	2	0	2
10.0: Athens	0	0	0	0	0	0
<b>Total</b>	<b>21</b>	<b>16</b>	<b>14</b>	<b>14</b>	<b>6</b>	<b>6</b>

\*Does not include vaccine-preventable diseases, tuberculosis, sexually-transmitted diseases, environmental or injury outbreaks

\*\*July–September 2006 and July–September 2007

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