Monday, December 03, 2012

IDPH Summary of *Salmonella* ser. Enteritidis, September 2012 (IL2012-276)

Background

On Tuesday, October 9, 2012 a cluster of *Salmonella* cases in three students of the same school was reported to the Illinois Department of Public Health (IDPH) by Lake County Health Department (LCHD). Two of the cases were serotyped as S. Enteritidis and one case was pending serotyping. The pulsed field gel electrophoresis (PFGE) pattern was available for one case and was identified as JEGX01.0023. An investigation was initiated at this time.

Food Handling and Environmental Investigation

On October 11, 2012, the Environmental Health Unit (EHS) of Cook County Department of Public Health received a call from their Communicable Disease Control Unit (CD) informing them of a potential *Salmonella* outbreak at a catering company in Wheeling, IL. EHS, CD and the Local Health Official conducted an investigation of the catering company on October 11, 2012 and found that they were not preparing any food.

An investigation was conducted the next day by EHS. A number of critical violations were noted on the inspection including temperature violations, bad hygienic practices, the presence of insects (flies) and improper storage of toxic items. It was decided in consultation with IDPH and CD that Company A would be allowed to stay open with certain restrictions while employees provided two consecutive *Salmonella* negative specimens. The restrictions were: no ready-to-eat foods until further notice; serve only hot foods and prepackaged foods; and sanitize all equipment and surfaces in the entire establishment. Follow-up inspections were conducted by EHS and the local health official on October 14, October 15, October 16 and October 22, 2012.

Case Information

Cases

In this investigation, eight confirmed and nine probable primary cases of *Salmonella* Enteritidis were identified (see case definitions below). The cases attended six different private schools located in Cook (including the City of Chicago), and Lake Counties. All six schools received food from the same food service vendor (Company A) located in Wheeling, Illinois. No other common events or exposures were identified among the cases. Cases resided in Cook, Lake and Kane Counties.

One secondary case was identified in a family member of a primary case. Onset of illness was 13 days after the primary case.

One sporadic case of *Salmonella* Enteritidis with the matching PFGE pattern was identified during the outbreak period but since no link to the other cases was found, it was considered unrelated to the outbreak and therefore was not included in the investigation.

Outbreak case definition for Illinois

Confirmed - a person:

- associated with a school that served food from Company A with onset of gastrointestinal symptoms between September 10, 2012 and October 12, 2012 (AND)
    - laboratory confirmed Salmonella ser. Enteritidis with the JEGX01.0023 PFGE pattern

  (OR)
- who is a contact to a confirmed case (AND)
    - laboratory confirmed Salmonella ser. Enteritidis with the JEGX01.0023 PFGE pattern

Probable - a person:

- associated with a school that served food from Company A with diarrhea (defined as 3 or more loose stools in a 24 hour period) and/or vomiting and fever with onset of symptoms between September 10, 2012 and October 12, 2012 (AND)
    - not tested (OR)
    - negative for Salmonella on stool testing greater than 2 weeks after onset of illness

Demographics

Nine of the cases were female and eight were male. Cases ranged in age from four to 14 years with a median of 10 years.

Clinical

Symptoms reported by cases included:

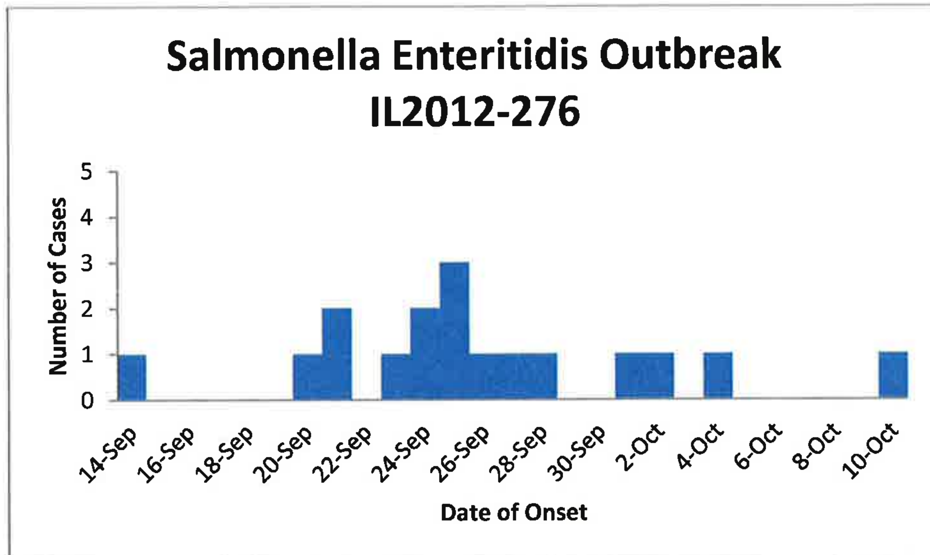
- Diarrhea = 16 (94%)
- Vomiting = 10 (59%)
- Fever = 16 (94%)
- Bloody stools = 4 (24%)

One case was hospitalized, four sought care at an emergency room, and eight visited a health care provider. Only one of the probable cases was tested and was negative for *Salmonella* but testing was greater than two weeks post onset of symptoms. All of the confirmed cases had the PFGE pattern JEGX01.0023, which is an uncommon S. Enteritidis pattern in Illinois.

Onsets of Illness

Onsets of illness of the primary cases ranged from September 14, 2012 to October 10, 2012 (see Figure 1).

Figure 1.



Epidemiologic Investigation

The investigation began with the standard open-ended interviews conducted with cases of salmonellosis in Illinois, which includes questions on illness, onset, contacts, food history and other exposure questions. Once cases were identified in more than one school, a questionnaire was developed by IDPH and sent electronically to all parents/guardians of students attending schools with confirmed cases. The questionnaire asked about illness in students, if students ate school-provided lunches, and whether they consumed specific items, such as food from the salad bar, during the likely period of exposure.

A letter and questionnaire was also sent by IDPH to all other schools that purchased lunches from Company A asking about gastrointestinal illnesses among students and staff during this time period. Other case finding efforts included memos to the local health departments in Illinois requesting heightened surveillance and reporting of suspect cases; notification of neighboring states; and posting of the outbreak information on the national PulseNet website.

Parent/Guardian Survey

Beginning on October 11, 2012, surveys were sent to parents/guardians of the five initial schools involved in the outbreak. A total of 317 completed surveys were returned.

Data from the surveys were downloaded into Excel and Epi Info7 for analysis. Information on suspect cases identified via the survey was provided to the appropriate health department for follow up about specimen submission. Ill persons who met the probable case definition were entered into I-NEDSS, the Illinois infectious disease surveillance system.

Excluded from the analyses were four respondents who listed schools that were not included in the cluster, nineteen respondents who reported illness that did not meet the case definition, and the confirmed secondary case. A total of 282 controls (students who ate school lunches but did not experience illness) were used as a comparison group.

Results

Sixteen of 17 cases (94%) reported eating school lunches. Fourteen students reported eating school lunches multiple days per week, while seven students ate daily, Monday through Friday. Only one student reported eating only one day during their exposure period and information was not available from one case. No single, common eating date could be identified among the cases indicating that intermittent exposure likely occurred over several weeks, which is consistent with the range of onset dates.

A statistical analysis of the data was completed but limitations in the data were considered in the interpretation. Overall, eating the school lunch alone was not found to be associated with illness in the analysis. However, students who ate food from the salad bar at least once from September 17, 2012 to September 28, 2012 were significantly more likely to experience illness compared to those who did not eat from the salad. , Because exposure to the salad bar was reported by less than 50% of well students, this exposure would not account for all illnesses. Eating fruit during the exposure period was not associated with illness.

Limitations

Various limitations of the investigation were identified, first of which was an inability to determine an accurate date of exposure for ill persons. Many of the ills reported eating school lunch multiple days per week, including a large percentage (41%) that eat five days per week. Unlike a group who has a single common exposure, such as eating at a banquet, this group had many possible exposures; therefore, determining a single source meal or food item was not feasible.

Another limitation was recall deficits in surveying a group of young children. Additionally, both parent/guardian and child may have experienced difficulty in recall due to the length of time between the exposure period and completion of the questionnaire.

Usage of the electronic survey allowed for quick distribution and completion of the survey which was a positive aspect of the investigation. Since the survey was self administered, the level of completion of the surveys varied and some of the data provided was unclear or conflicting. Future use of electronic surveys should be explored as an efficient manner of collecting data but procedures for improving data quality should also be looked at. Despite the limitations of the study, the electronic survey allowed the Department to quickly collect information on student illness and identify probable cases, as well as notify parents/guardians of the situation.

Customer Survey

A survey and letter was sent to customers of Company A. The survey asked about gastrointestinal illnesses among students and staff during this time period and whether the number of reports was above baseline for the time of year. Questionnaires received from customers were shared with the appropriate local health departments.

Results

Sixty surveys were received and 15 percent reported illnesses above baseline during this time period. The final confirmed case was later identified from one of these schools. The survey allowed the Department to notify customers of the situation and obtain information on the level of illnesses in these other schools to determine the scope of the outbreak.

Laboratory Investigation

The IDPH laboratory performed serotyping and PFGE analysis on all confirmed specimens. The cluster was posted to the CDC PulseNet website, which responded that a national increase was not present. This implied a local exposure and not a contaminated product.

Salmonella Enteritidis is a common *Salmonella* serotype seen in Illinois, but the PFGE pattern (JEGX01.0023) of the cases is not common in Illinois. No cases with this pattern were identified in Illinois in 2010 and only four cases were reported in 2011. The number of cases reported during the outbreak was above baseline for this time period and indicated an outbreak.

Food Handling and Environmental Investigation

Company A provided food to four schools in Cook County who had positive *Salmonella* cases. All four schools were inspected by EHS, CD and the Local Health Official. The inspections at the schools revealed critical items such as temperature violations, improper sanitizing, improper storage of toxic chemicals, and hand sink not accessible and no soap available. An inspection was also conducted at the Lake County school.

Company A was allowed to resume routine procedures on October 22, 2012 after clearance from the Cook County CD department and all EHS requirements were fulfilled. To ensure compliance the local health official will conduct ongoing inspections at the catering company on a monthly basis.

Food Handler Testing

Forty-one employees of Company A, who worked during the time period of the school illnesses, were to be tested until two consecutive negative specimens (at least 24 hours apart) were obtained from each worker. Six workers were let go or quit prior submitting two specimens. Attempts were made to follow up with these workers but were unsuccessful. Thirty-five workers submitted two negative specimens and were cleared to work. Testing was done at a private laboratory but was facilitated by the Cook County HD.

Conclusions

An outbreak of *Salmonella* Enteritidis occurred among students of six private schools who received school lunches from the same facility, Company A, from mid-September to mid-October 2012. Based on the extended range of onset dates and lack of cases in other areas, the most likely source of contamination was an infected food handler who through inadequate hygiene may have intermittently contaminated food served at the schools. Suboptimal hygiene was observed during the environmental inspection of the facility. None of the food handlers who were tested were positive for *Salmonella* but not all food handlers were tested since six employees were either let go or quit prior to completing testing. Additionally, specimens were collected one to two weeks after the last case onset, thus an infected food handler could have stopped shedding during that time period. Possible factors that may have contributed to bacterial proliferation included improper cold and hot holding temperatures observed during the inspection.