

Salmonella Serotype Enteritidis Infections Among Workers Producing Poultry Vaccine – Maine, 2006

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Introduction

- Most *Salmonella* infections are known to occur through ingestion of contaminated food, however, some outbreaks of *Salmonella* have been associated with environmental contamination.
- On November 15, 2006 Maine Center for Disease Control and Prevention (MeCDC) was notified of case of *Salmonella* in employee of poultry vaccine production facility.
- When second case in another employee at same facility was reported on November 25, MeCDC began investigation to identify additional cases, to determine risk factors, and to recommend control measures.

Background

- Plant manufactures vaccine for poultry
- Plant employed 74 people; 34 in production area
- Four phage types of *Salmonella* Enteritidis (SE) used in vaccine production and grown in fermentation room on site
- Waste from fermentation room processed in common Central Services Area (CSA) prior to disposal
- Lunchroom in separate building
- Plant licensed by United States Department of Agriculture which inspects every three year; last inspection in 2005
- Spill of stock SE occurred in fermentation room on November 9

Methods

Case Definition

- Employee who experienced ≥3 loose or watery stools in 24 hour period between November 1 and December 9

Case Finding

- Initial query of department heads by Human Resources

- Site visit made to interview ill employees, to facilitate specimen collection, and to collect work/production schedules
- Company wide survey by MeCDC
 - 67/74 (91%) employees interviewed
 - Enteric case investigation for all symptomatic employees

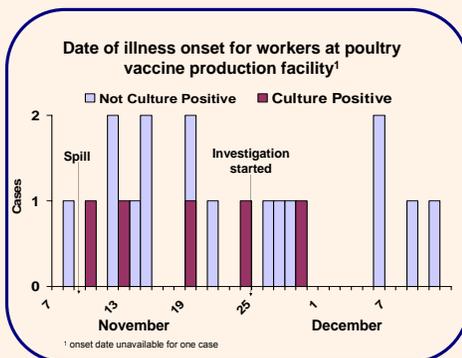
Laboratory

- Stool specimens requested of all employees with diarrhea
- Stock cultures of four phage types of SE used in production requested
- Seven isolates of SE from general population during 60 days prior to outbreak analyzed for comparison
- Clinical and environmental samples underwent serotyping and Pulse Field Gel Electrophoresis (PFGE) at MeCDC
- Phage typing by CDC and Canadian Science Centre for Human and Animal Health
- Environmental swabs and water samples collected

Results

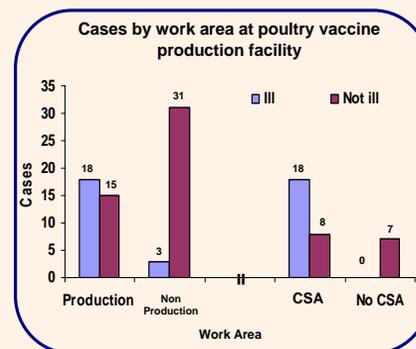
Epidemiology

- 21 (31%) of 67 employees met case definition



Epidemiology

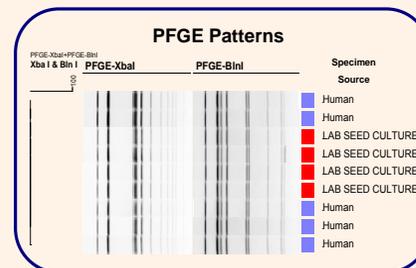
- No reported secondary cases in family or friends
- 5 of 8 tested cases were culture positive for *Salmonella*
- No hospitalizations or deaths
- Production workers more likely to be ill than non-production workers; 18 (55%) of 33 vs. 3 (9%) of 34 (RR=6.2, 95% CI 2.0-19.0)



- Production workers in CSA more likely to be ill than those not in CSA; 18 (69%) of 26 compared to 0 of 7 (p<0.002)

Laboratory

- Human isolates had indistinguishable PFGE pattern compared to stock culture



- Stock culture involved in spill was phage type 8
- Ill employee isolates (n=4) also phage type 8
- SE isolates from Maine residents not related to outbreak were phage type 13A
- All environmental swabs and drinking water samples were negative for *E. coli*

Conclusion

- Environmental contamination of heavily used work area, following spill of SE stock culture, may have served as ongoing source of SE, although exact mechanism for how workers became infected was undetermined.

Limitations

- Documentation of spill occurred 20 days after event, possible recall bias
- Environmental specimens collected three weeks after spill
- Due to clonal nature of SE, additional typing methods might be needed to differentiate between isolates

Recommendations

- Develop standard operating procedure for spills
- Increase use of personal protective equipment
- Restrict employees with diarrhea from work
- Routinely disinfect all work spaces
- Increase frequency of hand-washing

Acknowledgments

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