



Centers for Disease Control and Prevention

Atlanta, GA 30333

March 8, 1999

To: State and Territorial Epidemiologists
State and Territorial Public Health Laboratory Directors

Through: Director, Division of Bacterial and Mycotic Diseases _____

Subject: Update on *Salmonella* Serotype Enteritidis Infections

Salmonella serotype Enteritidis (SE), most commonly transmitted through shell eggs, continues to be an important public health problem in the United States. The proportion of *Salmonella* isolates reported to CDC through the Public Health Laboratory Information System (PHLIS) that were SE increased from 7% in 1980 to 25% in 1996 and then dropped to 23% in 1997. Since 1987, SE has been the second most common *Salmonella* serotype behind *S. Typhimurium*, although in 1990, 1994, 1995, and 1996 it was the most common serotype.

This document 1) summarizes outbreaks of SE infections reported to CDC with first onset of infection in 1998, 2) outlines procedures for reporting outbreaks of SE infections to CDC, and 3) discusses the role of the U.S. Food and Drug Administration (FDA) in SE outbreak investigations.

Please share this information with your personnel who conduct SE outbreak investigations. If the 1998 SE outbreak data from your state are incomplete or inaccurate, please contact Mary Evans at CDC's Foodborne and Diarrheal Diseases Branch.

SE Outbreaks Reported in 1998

As of March 1, 1999, 45 confirmed outbreaks of SE were reported, affecting U.S. residents in 19 states (Table). Of the 666 ill persons, 90 (14%) were hospitalized, and 3 died. Although the total number of SE outbreaks reported in 1998 is similar to the number reported in 1997, there were approximately half as many illnesses. This continues a recent trend whereby the median number of cases per outbreak has decreased from 17 in 1993 to 10 in 1998.

Of the 18 outbreaks in 1998 for which a vehicle could be confirmed, 15 (83%) were associated with eggs; implicated vehicles included chiles rellenos, homemade ice cream, lasagna, stuffing, tira misu, and ziti. Between 1993 and 1997, an average of 80% of vehicle-confirmed outbreaks have been egg-associated, with a range of 68%-95%.

Twenty-three (51%) of the 45 outbreaks occurred in commercial food establishments (e.g. restaurants, delis), compared with 31 (70%) in 1997 (Table). Twelve (27%) of outbreaks occurred in private homes, compared with 7 (16%) in 1997. Three (6%) of outbreaks and all of the reported deaths occurred in nursing homes in 1998, compared with one nursing home outbreak and no associated deaths in 1997.

SE phage type 4 continues to emerge, causing an increase in sporadic illness in the western United States. Of the 30 outbreaks for which an isolate was submitted to CDC for phage typing, 15 (50%) were SE PT 4 (Table). Of these, 11 (73%) occurred in California, two in Utah, and one each in Hawaii and Wyoming. Although most outbreak investigations and studies of sporadic illness due to SE phage type 4 in the United States have implicated eggs, in Europe SE phage type 4 is also transmitted by eating chicken. In the United States in 1998, one vehicle-confirmed outbreak and two outbreaks in which the vehicle was suspected but not confirmed were associated with eating chicken.

Phage type 8 accounted for 4 (14%) of 29 SE outbreaks in 1998; of these, 3 (75%) occurred in eastern states. Phage type 13a caused 6 (21%) of the SE outbreaks, and phage type 6a, rare in the United States, was responsible for 2 (7%) outbreaks.

While the number of SE outbreaks in the New England and Mid-Atlantic states decreased from 42 (67%) of 63 reported outbreaks in 1992 to 8 (18%) of 45 SE outbreaks in 1998, the number reported by the Mountain and Pacific states increased from 3 (5%) in 1992 to 23 (51%) in 1998. Although the precise reason for the decrease in the northeastern states is unclear, it may be a result of increased participation in egg quality assurance programs on farms and improvements in egg preparation practices.

The high incidence of SE infections, as well as the association of SE with foods containing raw or lightly cooked eggs, highlights the importance of conducting timely egg tracebacks to prevent SE outbreaks. To this end, CDC's Foodborne and Diarrheal Diseases Branch requests notification of SE outbreaks and outbreaks of group D *Salmonella* infections as soon as health departments become aware of them, regardless of whether or not a vehicle has been implicated. This preliminary notification need not be in the form of a final report. Early notification of possible egg-associated outbreaks will allow FDA and/or the Department of Agriculture in your state to prepare to conduct rapid tracebacks. See Appendix for detailed guidelines on investigating SE outbreaks.

Please contact the Foodborne and Diarrheal Diseases Branch to report any SE outbreaks and send final reports of outbreak investigations to:

Mary C. Evans, MPH
Foodborne and Diarrheal Diseases Branch
Centers for Disease Control and Prevention
1600 Clifton Road, Mailstop A-38
Atlanta, Georgia 30333

Federal Response to SE Outbreaks

Since October 1, 1995, FDA has administered an SE outbreak traceback program under authority of the Food, Drug, and Cosmetic Act. FDA assumed federal responsibility for SE tracebacks after the United States Department of Agriculture (USDA) activities, including tracebacks and on-farm testing, were suspended and funding for the USDA SE program was discontinued in October 1995.

If evidence indicates that contaminated eggs were the probable source of SE in a human outbreak, FDA will conduct microbiologic assessment of all production flocks that provided eggs at the time of the outbreak and monitor diversion of shell eggs from SE-infected farms to pasteurization facilities. Early reporting of egg-associated SE outbreaks to the Foodborne and Diarrheal Diseases Branch is encouraged to facilitate coordination with FDA and increase the proportion of egg-associated outbreaks that result in egg traceback and flock testing.

Laboratory Subtyping of SE Isolates

The CDC Foodborne Diseases Laboratory Section can provide subtyping support for epidemiologic investigations by determining the phage type of isolates from SE outbreaks. We would like to determine the phage type for SE isolates from each reported outbreak. If you have isolates from any SE outbreak in 1998 or other years that have not yet been sent to CDC, we would still like to receive them. Please send one human isolate and any outbreak-associated food isolates, accompanied by a DASH form for each isolate, to:

Peggy S. Hayes, Microbiologist
Centers for Disease Control and Prevention
Foodborne Diseases Laboratory, DBMD, NCID
1600 Clifton Road, Mailstop C-07
Atlanta, GA 30333

For each isolate submitted, **please indicate the outbreak with which it was associated** and whether it came from a patient, foodhandler, or food source. Please specify that the isolate is being submitted for phage type determination.

We recognize that this represents a considerable effort on your part. We hope that you find the results helpful. This information will be used to support epidemiologic and on-farm investigations. We look forward to working together toward controlling this important public health problem.

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cc: Director, Epidemiology Program Office
Director, Public Health Practice Program Office
FDA, ORA
FDA, CFSAN

APPENDIX

CDC Guidelines for Investigating Possible Egg-Associated SE Outbreaks

To facilitate state and FDA tracebacks and poultry flock activities, CDC requests preliminary notification of SE outbreaks in which eggs are considered the implicated source, based on reliable epidemiologic information and/or statistically significant correlation between foods eaten and incidence of illness and/or SE isolation from remaining food samples. The following should be addressed in the outbreak investigation report:

If cultures from a foodhandler yield SE, further information as to whether the illness preceded or was concurrent with the outbreak and whether the person also ate the food implicated in the outbreak can help to determine whether the foodhandler was a likely source of the outbreak.

The possibility of cross-contamination in the food preparation area and other factors that could have contributed to the outbreak should be considered. The food preparation investigation may identify critical control points for prevention of future outbreaks.

A copy of the final investigation reports for egg-implicated and other SE outbreaks should be sent to CDC to maintain accurate data in the SE Surveillance System. Please send this information to:

Centers for Disease Control and Prevention
Foodborne and Diarrheal Diseases Branch, DBMD, NCID
1600 Clifton Road, Mailstop A-38
Atlanta, GA 30333

Shell Egg Tracing

In an SE outbreak in which shell eggs are implicated, the following information should be collected to enable traceback of the eggs:

1. Whether cartons or cases in which the eggs used in the implicated food vehicle were still available at the time of the investigation. Whether any eggs were left in the container that held the suspected eggs.
2. Type and packing method of suspected eggs. (Note the source of each item mentioned, e.g., cartons or invoices)
 - a. Size (extra-large, large, medium, small, jumbo)
 - b. Color (white or brown)
 - c. Pack type

Bulk container (loose)--15- or 30-dozen case

Consumer container--1 dozen, 18 egg, or 2½ dozen, styrofoam

- d. All identifying markings, if the container is available (this information may be available on the packing slip):

Dates of pack, packer identification (plant number and state or federal [based on color of ink] packer), name and address of packer, grading line number or letter, sell-by date, expiration date, federal or state grade shield, and flock code.

e. Grade (AA, A, B, Not Graded)

3. Date(s) that eggs used or probably used in the implicated food vehicle were received at the outbreak location.
4. Source of eggs (including copies of all invoices, purchase receipts, and shipping and receiving documents); i.e., outbreak eggs were received directly from (name and address of distributor or processing plant that delivers eggs to the outbreak location).

If the egg shipment(s) went through one or more "stops" (middlemen or points of transfer such as a food wholesaler or distributor) between the egg production farm of origin and outbreak site and/or consists of eggs from more than one egg production farm of origin, provide the identification of each.

Salmonella serotype Enteritidis outbreaks reported to CDC, by Date of First Onset of Illness January 1 - December 31, 1998

Updated March 1, 1999

CDC ID#	Onset Month	State	City or County	Cases (#)	Hosp (#)	Deaths (#)	Exposure Location	Suspected Vehicle	Vehicle		
									Confirmed ? ¹	Contain Shell Eggs?	Phage type
1	1	CA	Sherman Oaks	5	3	0	Restaurant	Turkey stuffing	Y	Y	4
2	1	CA	Los Angeles	26	3	0	Home	Lasagna	Y	Y	4
3	1	MD	Montgomery Co.	8	0	0	Restaurant	Tira misu	Y	Y	8
4	1	MD	Montgomery	2	0	0	Restaurant	Chicken burritos	N	N	.
5	1	PA	Philadelphia	4	2	0	Restaurant	Unknown	N	.	13a
6	1	WA	Whatcom Co.	4	0	0	Private Home	Homemade egg nog	N	Y	.
7	2	CA	Arcadia	14	1	0	Restaurant	Chicken enchilada	Y	N	4
8	2	CT	Fairfield Co.	12	1	0	Restaurant	Eggs	N	Y	13a
9	3	CA	Lakewood	6	1	0	Private home	Homemade ice cream	N	Y	4
10	3	CA	Palmdale	8	0	0	Restaurant	Unknown	N	.	4
11	3	IL/WI	McHenry Co.	2	0	0	Restaurant	Hollandaise sauce	N	Y	13a
12	3	VA	Chilhowie	19	5	0	Restaurant	Cream pies	Y	Y	8
13	4	UT	Salt Lake Co.	21	2	0	Restaurant	Multiple egg products	N	Y	4
14	5	UT	Utah Co.	4	0	0	Restaurant	Caesar salad	N	Y	4
15	6	NJ	Passaic Co.	11	2	2	Nursing home	Unknown	N	.	8
16	6	OH	Franklin Co.	49	2	0	Restaurant	Unknown	N	.	13a
17	7	AZ	Maricopa	58	11	0	Restaurant	Chile relleno	Y	Y	6a
18	7	CA	Pico Rivera	6	2	0	Restaurant	Hamburgers	N	N	4
19	7	CA	Azusa	4	2	0	Private home	Boiled chicken	N	N	4
20	7	CO	Denver Co.	5	0	0	Restaurant	Unknown	N	.	13a
21	7	IL	Ogle Co.	8	4	0	Restaurant	Baked potato w/ cheese	Y	N	.
22	7	MD	Queen Anne's	5	0	0	Prison	Unknown	N	.	.
23	7	PA	Dauphin Co.	6	1	0	Private home	Homemade ice cream	Y	Y	RDNC
24	8	CA	Northridge	4	0	0	Restaurant	Unknown	N	.	.
25	8	HI	Oahu	40	3	0	Community	Eggs	Y	Y	4
26	8	MD	Harford	16	2	0	Catered dinner	Cannoli / cream puffs	Y	U	.
27	8	TX	Greenville	11	11	0	Private home	Homemade ice cream	Y	Y	8
28	9	CA	San Francisco	23	1	0	Restaurant	Stir-fried crab	N	N	1
29	9	CA	Malibu	6	0	0	Restaurant	Unknown	N	.	4
30	9	MD	Prince George's	50	7	0	Party	Mexican cake	Y	Y	.

31	9	MD	Frederick	10	0	0	Camp	Scrambled eggs	N	Y	.
32	9	NV	Eureka	71	4	0	Restaurant	Ziti	Y	Y	.
33	9	WI	Oconto Co.	4	0	0	Restaurant	Eggs	N	Y	13a
34	9	WY	Unita Co.	6	0	0	Community	Unknown	N	.	4
35	10	CA	Lakewood	18	2	0	Church	Chile rellenos	Y	Y	4
36	10	CA	Los Angeles	17	0	0	Nursing home	Pureed diet	Y	Y	4
37	10	CA	Los Angeles	13	1	0	Restaurant	Turkey salad	N	N	6a
38	10	CA	Montebello	4	4	1	Nursing home	Eggs	N	Y	.
39	11	CA	Long Beach	10	0	0	Private home	Stuffing	N	U	.
40	11	PA	Lebanon Co.	12	3	0	Private home	Stuffing	Y	Y	.
41	11	MA	Mansfield	7	0	0	Restaurant	Pork fried rice	N	Y	RDNC
42	11	WI	Racine Co.	18	3	0	Private home	Turkey	N	N	.
43	11	WV	Elkview/Kanawha	11	0	0	Private home	Unknown	N	.	.
44	12	PA	Carbon Co.	21	7	0	Private home	Stuffing	Y	Y	.
45	12	PA	Snyder Co.	7	0	0	Private home	Oyster stuffing	Y	Y	.

"." indicates missing or unknown data

¹ Based on reliable epidemiologic information, statistical implication, or SE isolation from remaining food samples

RDNC = Reacted, but did not conform (various phage lysis patterns)