

**Outbreak of *Salmonella* Enteritidis infections in people attending a village event in Latvia**

J Patrina<sup>1</sup>, I Antonenko<sup>1</sup>, J Perevoščikovs<sup>2</sup> ([perevoscikovs@sva.lv](mailto:perevoscikovs@sva.lv))

<sup>1</sup>Jelgava branch of the State Agency "Public Health Agency" (Valsts agentūras "Sabiedrības veselības agentūra" Jelgavas filiāle)

<sup>2</sup>Department of Epidemiological Surveillance of Infectious Diseases, State Agency "Public Health Agency" (Valsts agentūra "Sabiedrības veselības agentūra")

An outbreak of gastroenteritis due to *Salmonella* Enteritidis associated with an outdoor public holiday event occurred in a small village in southern Latvia on 21 July 2006. The outbreak lasted from 22–25 July. Descriptive and analytical epidemiological investigations were conducted to determine the extent of the outbreak, and to identify outbreak-related risk factors. Of approximately 260 people who attended the event, 107 participants were interviewed and 49 people fulfilled the criteria of an outbreak case (attack rate 46%). Stool specimens from 26 people including 17 kitchen workers, were microbiologically tested, and eight specimens were found to be positive for *S. Enteritidis*. The retrospective cohort study revealed that a fried pork dish made with raw egg was the likely cause of the outbreak (RR: 7.8, 95% CI 5.2–11.78;  $P < 0.001$ ).

**Outbreak background**

A cluster of three cases of gastroenteritis with onset on 22 July in patients from the same area was reported to the local branch of the State Agency "Public Health Agency" in Jelgava (PHA, Valsts agentūras "Sabiedrības veselības agentūra" Jelgavas filiāle) on 24 July 2006. The investigation revealed a relationship between the cases and attending an event in small village X on 21 July. On 24 July it was decided by public health authorities that a full investigation should be carried out to determine the extent of the outbreak and to identify the outbreak cause by using a retrospective cohort study.

**Outbreak case definitions**

*Probable case:* A probable case was defined as a person who attended the event in village X on 21 July, ate dishes served there, and then became ill with symptoms of diarrhoea.

*Confirmed case:* A confirmed case was defined as a person who attended the event in village X on 21 July, ate dishes served there, and then became ill with symptoms of diarrhoea and had a microbiologically confirmed *S. Enteritidis* infection.

An exposure was defined as consumption of a food item prepared and served by the staff of restaurant Y, which prepared all the food available at the event. The food items available included two different soups, smoked sausages, a rissole dish made from salad with cut potatoes and other boiled vegetables, pickled cucumbers, boiled eggs and meat products mixed with mayonnaise, braised cabbage, bread, pâté with bacon, fried pork (fried with raw egg), cake, vegetables (tomatoes and cucumbers), beer, coffee and soft drinks (made up on site from syrup and water).

Patients who developed diarrhoea (with or without vomiting), abdominal pain or fever in the four days after attending the event were considered to have been ill with acute gastroenteritis.

The municipality provided a list of all the people who participated in the public holiday event in village X ( $n=260$ ). Information about the outbreak was released to the media in order to invite participants to come forward for interview. A total of 107 people were considered for the cohort analysis: eight were contacted in hospital and 99 were contacted at home. A questionnaire was developed at the local branch of PHA using Epi Info 3.2.2. Interviews were carried out face to face or by telephone, and included questions on basic demographic data, symptoms and clinical signs, date and time of clinical onset, duration of illness, admission to hospital and food history, which included using the list of food items available at the public holiday event.

We compared the food-specific attack rates (AR) for each food item on the list among the exposed and the non-exposed cohort members in the univariate analysis (all statistical tests,

including chi-square, 95% confidence interval and P value). The measure of association was the relative risk (RR).

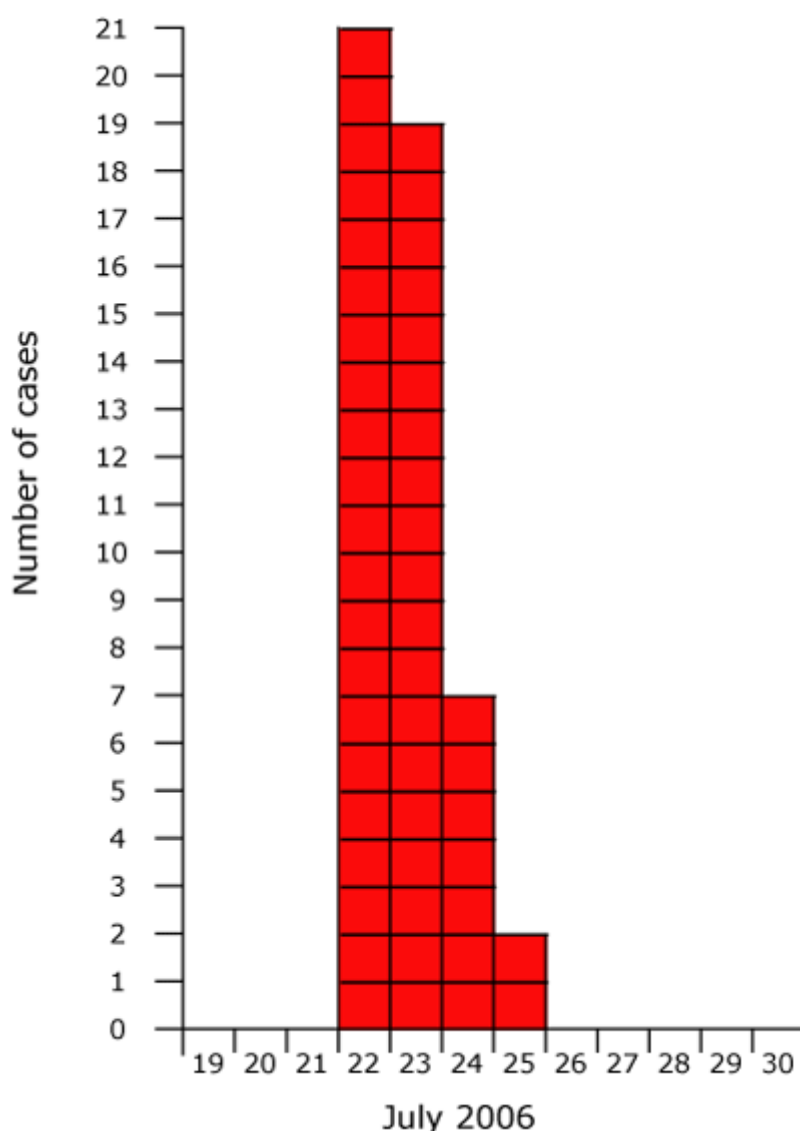
## Results

Of approximately 260 people who attended the village event, 107 participants were interviewed and 49 people fulfilled the criteria of an outbreak case (attack rate = 46%). Stool specimens from 28 people, including all 17 kitchen workers from restaurant Y, were microbiologically tested, and eight specimens were found to be positive for *S. Enteritidis*.

On 27 July, a clinical microbiology laboratory reported a cluster of stool samples positive for *S. Enteritidis*.

The local food safety authority was regularly updated about the situation, so that it could perform control measures in the implicated restaurant Y, which had prepared and served food for the participants of the event.

**Figure.** Cases of *S. Enteritidis* infection by date of symptom onset, after attending a village public holiday event in Latvia on 21 July 2006 (n=49)



## Analysis

The questionnaires were completed for all cohort members. Women made up 65 (61%) of the 107 cohort members. The median age was 42 years (range 2–70). The outbreak lasted from 22–25 July, peaked on July 22 and indicated a common point source outbreak.

Forty nine patients in the cohort met the case definition of an outbreak case (attack rate (AR) = 46%). Among these 49 cases were 29 women (59%) and 20 (41%) men, and the median age was 39 years (range 2–70). The case distribution by age group and sex is illustrated in Table 1.

Stool specimens from 26 people, including eight symptomatic participants, two symptomatic kitchen workers of restaurant Y, 15 asymptomatic kitchen workers and one asymptomatic participant, were tested for salmonella, and eight specimens, including two from kitchen workers, were found to be positive for *S. Enteritidis* and fulfilled the definition criteria of a confirmed outbreak case.

In addition to diarrhoea, 20 patients (41%) reported nausea, 16 patients (33%) reported vomiting and 34 patients (69%) reported fever. The mean duration of illness was 5 days. Nine patients were admitted to hospital. All 49 patients recovered.

Epidemiologists from the local branch of PHA collected six table eggs from restaurant Y's kitchen, where all meals for the public holiday event had been prepared. The eggs were from the same supplier as those used for the event, but were from a later batch. No other food item served at the event was available for microbiological examination at this time. Salmonella test results for the eggs were negative.

During the epidemiological investigation, it was established that the food prepared in restaurant Y was stored unrefrigerated, from around three hours after preparation until consumption. The univariate analyses of food exposures revealed that only the consumption of pork was positively associated with illness. An association with disease risk at a 5% significance level was found for fried pork (RR: 7.8; 95% CI 5.2-11.78; P=0.001) (Table).

**Table.** Food-specific attack rates for *S. Enteritidis* infections associated with attending a public holiday event, July 2006

Dishes available	Exposure: Yes			Exposure: No			RR	95% CI	P value
	III	Total	AR%	III	Total	AR%			
Fried pork	48	92	52.2	1	15	6.7	7.8	5.2-11.78	0.001
Rissole	26	65	40	23	42	54.8	0.7	0.44-1.20	0.13
Smoked sausages	28	67	41.8	21	40	52.5	0.8	0.49-1.29	0.28
Mixed salad	33	76	43.4	16	31	51.6	0.8	0.53-1.32	0.44
Cake	23	51	45.1	26	56	46.4	1	0.56-1.69	0.89
Soup I	21	53	39.6	28	54	51.9	0.8	0.44-1.32	0.2
Soup II	0	0	-	0	0	-	-	-	0
Braised cabbage	17	42	40.5	32	65	49.2	0.8	0.44-1.52	0.375
Drink	4	13	30.8	45	94	47.9	0.6	0.20-2.09	0.246
Bread	5	11	45.5	44	96	45.8	1	0.30-3.25	0.981
Beer	13	31	41.9	36	76	47.4	0.9	0.43-1.81	0.609
Pâté	17	51	33.3	32	56	57.1	0.6	0.33-1.04	0.014

Vegetables	13	31	41.9	36	76	47.4	0.9	0.43- 1.81	0.608
Coffee	16	38	42.1	33	69	47.8	0.9	0.46- 1.68	0.569

**Conclusions**

The epidemiological investigation revealed that a fried pork dish made with raw egg was the likely cause of the outbreak, and that inadequate preparation and storage of the food contributed to the outbreak's development.