Outbreak of Salmonella Stanley in Sweden Associated with Alfalfa Sprouts

Outbreak of *Salmonella* Stanley in Sweden associated with alfalfa sprouts, July-August 2007

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The Swedish Institute for Infectious Disease Control (SMI) and the Swedish Regional Centres for Communicable Disease Control recently completed the investigation of a nationwide outbreak with 51 cases of *Salmonella* Stanley infection. A matched case-control study (using telephone interviews) was performed that strongly indicated an association between consumption of alfalfa sprouts produced in Sweden and *S.* Stanley infection (OR 28.6, 95% CI 3.8-216.4). *S.* Stanley was not isolated from any of the food items tested.

Introduction

Domestic cases of *S.* Stanley occur in Sweden but have been quite rare, with an average of four per year between 1997 and 2005. In 2006, there were 32 cases of which 13 cases represented an outbreak caused by lime leaves [1]. Sprouts have been a common cause of food-borne *Salmonella* infection of various serotypes in Sweden. Between 1988 and 2001, nine outbreaks of salmonellosis caused by sprouts, mostly alfalfa sprouts, were detected in Sweden. In 1995, an outbreak of *S.* Stanley caused by alfalfa sprouts occurred in Finland and the United States, and contaminated alfalfa seed from a Dutch exporter was identified as the cause of infection in both countries [2,3]. In 2001, peanuts were identified as the source of another international *S.* Stanley outbreak [4].The present outbreak was recognised on 26 July 2007. During

July and August, 44 domestic cases of *S.* Stanley occurred with an identical Pulsed-Field Gel Electrophoresis (PFGE) pattern. Another seven cases were interpreted as part of the outbreak but have not been confirmed by PFGE.

An Enter-net alert was issued for the *S.* Stanley increase. There were *S.* Stanley cases in other countries, but no more than usual.

Methods

A case was defined as a person in Sweden who presented a stool sample with a laboratory-confirmed isolate of *S.* Stanley, with onset of gastroenteritis symptoms on 1 July 2007 or later, and who had not travelled abroad during two weeks prior to onset.

Forty-one cases and 62 controls were interviewed with a questionnaire concerning symptoms, travel history, consumption of a large number of specific food items and some other exposures. The controls were matched according to age, sex and place of residence (postal code area). Two matched controls were intended for each case, but were not achieved for all the cases.

The case-control study was analysed on 31 July. Ten cases that were identified later were not included.

On 30 July, a sample of lime leaves was tested, as it had previously been identified as the cause of Swedish *S.* Stanley infections [1]. Once alfalfa sprouts were suspected as the probable source of the outbreak, on 31 July samples of four commercial products containing alfalfa sprouts from food stores and alfalfa sprouts from a salad buffet in a restaurant were cultured, but there was nothing left of the sprouts from the batch associated with the *S.* Stanley infections. Alfalfa seeds from a large-scale sprout producer in southern Sweden with nationwide distribution of sprouts was sampled on 7 August, but unfortunately, there was no seed left from the batch suspected to have caused the *S.* Stanley outbreak.

Results

The case-control study strongly indicated that alfalfa sprouts could be the vehicle of infection. 19/41 cases confirmed having eaten alfalfa sprouts as compared to 3/62 of the controls (odds ratio 28.6, 95% confidence interval 3.8-216.4, p-value <0.0001). The odds ratio was estimated by conditioned logistic regression (equivalent to Mantel Haensel).

For 48/51 cases, the date of onset of symptoms could be determined (Figure 1). 42 of them fell ill between 8 July and 22 July 2007. The cases were not concentrated to any particular region in Sweden. The age range was 10 months – 88 years, but there were few children and few very old people. The median age was 35 years. Twent-two cases were male and 29 were female, but among those over 40 years of age, only 4/21 cases were male (Figure 2).

The cases had eaten alfalfa sprouts from various food stores or restaurants throughout Sweden. Alfalfa sprouts suspected to have caused the outbreak were mostly delivered from the large-scale sprout producer mentioned above. The seed was imported from a wholesaler distributing alfalfa seed to other sprout producers in Sweden as well. *S.* Stanley was not found in any of the food items tested.

Another species, *Salmonella* Mbandaka, was found in the sample of alfalfa seed from the large-scale sprout-producer. (Note that the sample was not from the batch of seed suspected to have caused the *S*. Stanley outbreak). Until July 2007, there have been four domestic cases of *S.* Mbandaka in Sweden with the same PFGE pattern as the strain of *S*. Mbandaka in the sprout sample. Those cases were concentrated to the period May 20 to June 30. Two of them reported eating alfalfa sprouts before onset of symptoms.