

Outbreak of norovirus infection associated with the consumption of frozen raspberries, France, March 2005

Benoît Cotterelle¹, Corinne Drougard¹, Jacqueline Rolland², Monique Becamel², Marc Boudon³, Stéphane Pinede³, Ousmane Traoré⁴, Katia Balay⁵, Pierre Pothier⁵, and Emmanuelle Espié⁶ (e.espie@invs.sante.fr)

¹Cellule Interrégionale d'Épidémiologie d'intervention d'Auvergne, Clermont-Ferrand, France

²Direction départementale des actions sanitaires et sociales Haute Loire, Clermont-Ferrand, France

³Direction départementale des services vétérinaires Haute Loire, Clermont-Ferrand, France

⁴Centre Hospitalo-Universitaire, Clermont-Ferrand, France

⁵Centre National de Référence des virus entériques, Centre Hospitalo-Universitaire, Dijon, France

⁶Institut de Veille Sanitaire, St Maurice, France

An outbreak of gastrointestinal illness in students who ate in a secondary school canteen in the administrative département of Haute-Loire, central France was reported to the local health authorities on 23 March 2005. The school has 30 teachers and 334 students, of whom 298 ate lunch at the school canteen. On 24 March, using a standardised questionnaire, students and teachers were asked about recent gastrointestinal illness, and food and drink consumption. A case was defined as a student or teacher at the school who had diarrhoea or vomiting accompanied by at least one other symptom (nausea, abdominal pain, vomiting or diarrhoea) since 21 March 2005. Students who reported recent gastrointestinal illness were asked to submit stool specimens for laboratory testing. A review of food handling procedures was carried out in the school restaurant, and samples of the meals served on 21 and 22 March were tested for common foodborne pathogens.

Of the 270 students and teachers interviewed, 75 (28%) met the case definition. Of the 75 cases, 69 (92%) reported abdominal pain, 59 (79%) vomiting, 53 (71%) nausea, 38 (51%) diarrhoea and 15 (20%) fever. None of the ill students or teachers was admitted to hospital, and all recovered. Duration of illness ranged from less than 1 day to 2 days. Incubation periods, calculated as the time interval between lunch on the 21 March and onset of symptoms, ranged from 12 hours to 56 hours, with a mean of 36 hours and a median of 37 hours.

Consumption of raspberries with fromage blanc (a fresh cheese similar to quark or cottage cheese), a dessert served at lunch on 21 March, was significantly associated with illness (relative risk (RR) 3.3; 95% confidence interval (CI) 1.5-7.5), and was reported by 69 of 74 cases (93%) for whom questionnaires were answered completely. The consumption of fromage blanc alone was not associated with illness (RR 1.8; 95% CI 0.4-9.0). Five of the 6 stool specimens submitted by the students tested positive for norovirus genogroup I genotype 5 (Musgrove virus, a genotype not previously identified in France). Bacteriological cultures of the food samples tested negative for *Escherichia coli*, *Staphylococcus aureus*, clostridium sp, *Bacillus cereus* and salmonella. The first analyses of the raspberries for norovirus, from an unopened package from the same producer as those consumed by the cases, were negative. Further analyses are ongoing.

The raspberries, purchased deep frozen, had been mixed with the fromage blanc in a blender while still frozen. The mixture was scooped with a spoon into bowls by a staff member in the canteen. The staff member then used his hands to put a frozen raspberry on each dessert. None of the staff in the restaurant reported gastrointestinal illness in the week before the outbreak.

The Food-borne viruses in Europe network (FBVE, <http://www.eufoodborneviruses.co.uk>) was informed of the outbreak on 23 April, and an alert was sent out to the European authorities via the European Early Warning and Response System (EWRS) on 25 April. No other outbreaks associated with the consumption of raspberries have been notified in France recently.

Freezing allows viruses to survive in berries for a long time. Transmission of viruses such as hepatitis A by contaminated berries have been reported in the literature [1-3]. Outbreaks of norovirus infections attributed to raspberries have been documented in Canada in 1997 and Finland in 2002 and 2003 [4-6].

Conclusion

The investigation strongly suggests that this outbreak of gastrointestinal illness was due to norovirus infection, with contaminated raspberries as the most likely vehicle of infection. The absence of illness in the restaurant staff before the outbreak, and the lack of association between illness and the consumption of other food items prepared by the same staff, suggest that the raspberries had been contaminated before their preparation in the restaurant. However, the hypothesis that the raspberry desserts were contaminated during their preparation cannot be excluded. The raspberries had been imported from outside France. If the raspberries had been contaminated before being frozen and packaged, similar outbreaks may occur in other countries. If norovirus contamination on the raspberries is confirmed, or if other outbreaks related to this product are reported, the supplier and country of origin of the raspberries will be made available through the Rapid Alert System for Food and Feed (RASFF, http://europa.eu.int/comm/food/food/rapidalert/index_en.htm).

Information on other outbreaks that may be linked to consumption of raspberries can be reported to Emmanuelle Espie at the Institut de Veille Sanitaire in France (e.espie@invs.sante.fr)

References:

1. Niu MT, Polish LB, Robertson BH, Khanna BK, Woodruff BA, Shapiro CN, et al. Multistate outbreak of hepatitis A associated with frozen strawberries. *J Infect Dis* 1992; **166**: 518-24.
2. CDC. Hepatitis A associated with consumption of frozen strawberries - Michigan, March 1997. *MMWR Morb Mortal Wkly Rep* 1997; **46**(13):288, 295. (<http://www.cdc.gov/mmwr/preview/mmwrhtml/00047129.htm>)
3. Reid TMS, Robinson HG. Frozen raspberries and hepatitis A. *Epidemiol Infect* 1987; **98**(1): 109-112.
4. Le Guyader FS, Mittelholzer C, Haugarreau L, Hedlund KO, Alsterlund R, Pommepuy M, Svensson L. Detection of noroviruses in raspberries associated with a gastroenteritis outbreak. *Int J Food Microbiol* 2004; **97**(2): 179-86.
5. Ponka A, Maunula L, von Bonsdorff CH, Lyytikäinen O. An outbreak of calicivirus associated with consumption of frozen raspberries. *Epidemiol Infect* 1999; **123**(3): 469-74.
6. Gaulin CD, Ramsay D, Cardinal P, D'Halevyn MA. [Epidemic of gastroenteritis of viral origin associated with eating imported raspberries]. *Can J Public Health* 1999; **90**(1):37-40. [Article in French]

[back to top](#)
