# Hand hygiene and safe food handling practices are imperative to reduce risk of asymptomatic transmission of norovirus

## Six events, a caterer and a norovirus outbreak – Canberra, November 2022

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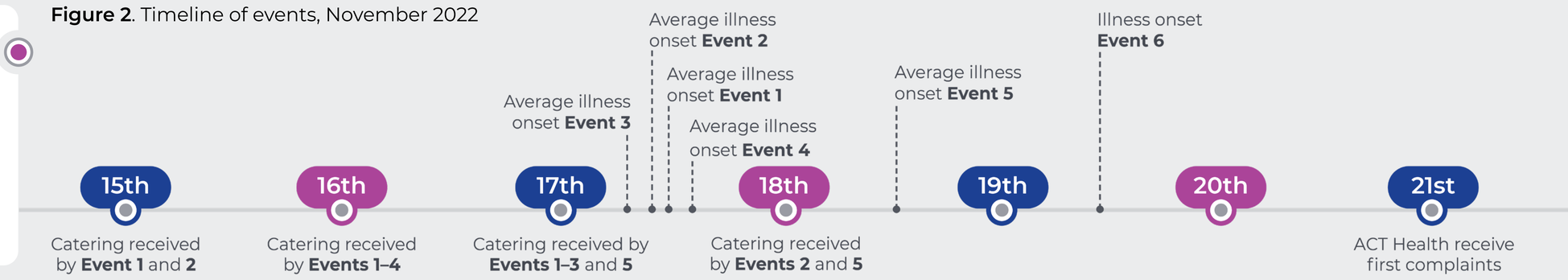
## Background

We investigated an outbreak of gastroenteritis associated with a caterer who supplied food to six events in Canberra over three days in November 2022.

**Figure 2**. Timeline of events, November 2022




## Case definition

**Probable case:** consumed food supplied by the caterer from 16–18 November and experienced either vomiting or diarrhoea or abdominal pain.

**Confirmed case:** met the probable case definition and had norovirus detected by nucleic acid amplification testing.

## Hypothesis

- Viral gastrointestinal infection
- Infected food handler
- Generalised food contamination

## Methods

- Epidemiological, environmental and microbiological investigations
- Case definition developed
- Tailored food questionnaires developed in REDCap
- Retrospective cohort studies conducted for events on two days
- Univariate analysis, followed by multivariate analyses
- Employees surveyed regarding days worked, foods prepared, illness and ill contacts
- Faecal specimens collected from symptomatic event attendees
- Food and environmental samples collected for microbiological analysis
- Food safety inspection undertaken.

## Results

### Descriptive analysis

**Figure 1**: Epidemic curve for gastroenteritis associated with a single caterer, by exposure date, Canberra, November 2022

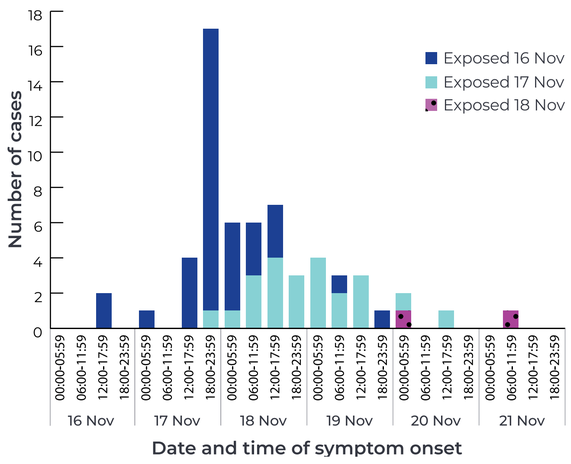


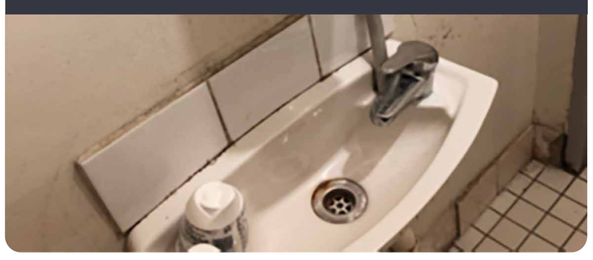

**Table 1.** Illness, demographic and diagnostic characteristics of catering associated outbreak cases, Canberra, November 2022

| Characteristic | N = 64 |
|---|---|
| Median age | 47 (15-69) years |
| Female sex | 41 (64%) |
| Date and time of first onset | 16/11/2022 15:50 |
| Date and time of last onset | 21/11/2022 06:00 |
| Median incubation period | 33.0 hours (3.8–97 hours) |
| Median duration of illness | 68.2 hours (7.3–230.3 hours) |
| Symptoms (% of cases) | |
| Diarrhoea | 70 |
| Nausea | 80 |
| Vomiting | 73 |
| Abdominal pain | 70 |
| Myalgias/arthralgias | 53 |
| Fever | 48 |
| Headache | 58 |
| Blood in the stool | 0 |
| No. of Dr visits | 6 (9.3%) |
| No. of ED presentations | 4 (6.3%) |
| No. of hospitalisations | 0 |
| No of specimens tested | 7 |
| Specimen result | Norovirus positive |

### Microbiological and environmental investigations

- All seven faecal specimens from 3 events were positive for norovirus
- Genotyping on three specimens from two events matched
- No food handlers reported illness prior to the outbreak
- One food handler reported their child had gastroenteritis in the preceding week
- This food handler prepared vegetarian rice paper rolls and sushi on day 1 and vegetarian rice paper rolls, sushi and wraps on day 2
- Microbiological testing of seven food samples produced two marginal results: a coagulase positive *Staphylococcus* in the sandwich egg mix and a high standard plate count in the roast beef
- These indicate poor hand hygiene and food handling
- Environmental inspection identified inadequate handwashing facilities and exclusion policies and procedures
- Environmental swabs did not detect *Salmonella* or *Listeria* species.

Studies have found norovirus is often detected on bathroom surfaces rather than food preparation areas in food businesses involved in viral gastrointestinal outbreaks



Photograph 1: Small handbasins in bathrooms at food preparation premises

### Results: Analytical studies

- 108/134 (81%) attendees on the two days completed food questionnaires
- Each event had sightly different menus
- Sandwiches, wraps, rice paper rolls, sushi and fruit were prepared daily.

**Table 2.** Univariate and multivariable analyses of risk factors for illness at events supplied by a single caterer, where the P-value was less than 0.1 on univariate analysis, 16th and 17th November 2022

| | Exposed | Not exposed | Univariate analysis | | Multivariable analysis | |
|---|---|---|---|---|---|---|
| Exposure | AR | AR | RR (95%CI) | P | aRR(95% CI) | P |
| 16th November | | | | | | |
| Vegetarian rice paper rolls | 77.3 (17/22) | 47.8 (11/23) | 1.6 (1.0 – 2.6) | 0.04 | 1.7 (0.8 – 3.8) | 0.2 |
| Egg sandwiches/baguettes | 79.2 (19/24) | 53.6 (15/28) | 1.5 (1.0– 2.2) | 0.05 | 1.2 (0.6 – 2.7) | 0.6 |
| 17th November | | | | | | |
| Sushi | | | | | | |
| Teriyaki chicken | 77.8 (7/9) | 44.8 (26/58) | 1.7 (0.99 – 2.7) | 0.08 | 0.9 (0.2– 4.0) | 0.8 |
| Tuna | 85.7 (6/7) | 45.0 (27/60) | 1.9 (1.1 – 2.9) | 0.05 | 1.5 (0.5 – 5.0) | 0.5 |
| Teriyaki beef | 100.0 (6/6) | 44.3 (27/61) | 2.3 (1.7 – 3.0) | 0.01 | 1.8 (0.4 –8.2) | 0.4 |
| Any sushi | 75.0 (12/16) | 41.2 (21/51) | 1.8 (1.2 – 2.8) | 0.02 | 1.2 (0.3 – 4.0) | 0.8 |
| Wraps | | | | | | |
| Roast beef | 73.3 (11/15) | 42.3 (22/52) | 1.7 (1.1 – 2.7) | 0.04 | 1.0 (0.4 – 2.9) | 0.9 |
| Any | 60.6 (20/33) | 38.2 (13/34) | 1.6 (0.95 – 2.6) | 0.07 | 1.4 (0.6 – 3.6) | 0.4 |
| Roast vegetable sandwich | 100.0 (4/4) | 33.3 (2/6) | 3.0 (0.97– 9.3) | 0.08 | | |

*Multivariable analysis not performed for roast vegetable sandwiches as these were only eaten at one event

## Conclusion

The outbreak of gastroenteritis in this investigation was found to be due to norovirus clinically, epidemiologically and on laboratory investigation. The infection source was most likely an asymptomatic infected food handler and inadequate food-handling controls. Cohort studies revealed illness was associated with several foods on univariate analysis and no specific foods on multivariate analysis consistent with generalised contamination of foods.

This study demonstrates the significant morbidity and loss of productivity that foodborne norovirus outbreaks cause, and the importance of effective hand hygiene and food handling practices at all times given asymptomatic individuals can excrete and transmit norovirus.

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Acknowledgement of Country
Canberra Health Services acknowledges the Ngunnawal people as traditional custodians of the ACT and recognises any other people or families with connection to the lands of the ACT and region. We acknowledge and respect their continuing culture and contribution to the life of this region.

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