

# Commentary

## An outbreak of Norwalk virus gastroenteritis following consumption of oysters

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This report of an outbreak of gastroenteritis associated with oyster consumption is an important reminder of the risks associated with consumption of raw or undercooked foods of animal origin, and the risks associated with the contamination of oyster harvesting areas with human sewage.

The authors should be congratulated for their cross-border collaboration in investigation of the outbreak and for their joint report. In the absence of a national outbreak database, such reports provide the basis for developing food safety policy and programs.

While the only laboratory evidence for Norwalk virus infection was a positive PCR result from a single stool, the symptom profile, incubation period, and duration of illness are entirely consistent with previous outbreaks of Norwalk virus infection<sup>1</sup>. In similar outbreaks where the symptoms, incubation period, and duration of illness suggest a viral aetiology, RT-PCR, as used in this investigation could be increasingly utilized. This technique is estimated to detect as little as 10 to 1,000 Norwalk virus particles per millilitre of stool<sup>2</sup> compared to a lower level of detection of 10<sup>5</sup> to 10<sup>6</sup> particles per millilitre of stool by electron microscopy<sup>3,4</sup>.

The authors acknowledge that the need to carry out a rapid field investigation may have introduced some biases. However, it is inconceivable that any plausible bias could account for such a strong association with oyster consumption. Alternative methods of analysis could have been employed to remove some of the biases - such as analysing all attendees at the two large functions that had 18 and 24 cases respectively. Instead they chose to use a nested case-control or case-cohort style methodology with a convenience sample of controls from various restaurants and functions. The fact that

the prevalence of vomiting and diarrhoea were in the upper range of that reported in previous reviews, and the rate of medical consultation was so high, is probably due to more severe cases contacting the health departments. This bias could have been addressed through studying all well and ill persons in well defined cohorts, or random sampling of cases and/or controls within large well defined cohorts.

The subsequent outbreak of hepatitis A associated with oysters from Wallis Lake has focused consumer attention on the safety of oyster consumption<sup>5</sup>. Oyster associated outbreaks are likely to be increasingly recognised for the following reasons:

1. Many estuaries are subject to increasing urban development with associated overflows from sewage treatment plants, septic systems and storm water discharges. It may take years to provide the infrastructure required to protect these waterways.
2. Consumers are increasingly concerned about food safety<sup>6</sup> and may be more likely to report illness.
3. Health agencies are using more advanced epidemiological and laboratory investigation methods (e.g. PCR) that will increase the likelihood of similar outbreaks being detected.

In order to protect the health of oyster consumers viral monitoring of harvest areas should be introduced as a research program. However, this is a relatively new methodology requiring time to learn how to interpret the results, and therefore should not be considered a panacea. In this outbreak it was interesting to note that an adenovirus was detected in oyster material, but no Norwalk virus was detected. However, faecal coliforms were above the recommended level, and as an interim measure, compliance with existing guidelines should be a priority.

The New South Wales Health Department has previously recommended consumers should be made aware of the risks associated with the consumption of raw seafood. In particular, persons at increased risk of death due to oyster associated infections should be aware of that risk<sup>7</sup>. This includes people with liver disease who are at risk of complications due to *Vibrio vulnificus* and *V. parahaemolyticus*, and hepatitis A infection (*Vibrio* are not associated with sewage contamination). In addition, persons with immune-compromising conditions such as cancer and AIDS, and the elderly, are at increased risk of fulminant infections associated with raw oyster consumption. It would be worthwhile evaluating to what extent these high risk groups are aware of these warnings. In the state of Florida in the United States of America the following notice is required at all points of raw oyster sale:

*Consumer information: There is risk associated with consuming raw oysters. If you have chronic illness of the liver, stomach, or blood or have immune disorders, you are at greater risk of serious illness from raw oysters and should eat oysters fully cooked. If unsure of your risk, consult a physician.*

Some groups object to such warnings and hold the view that food is either 'safe for everyone' or 'not safe enough for anyone'. This is based on the premise that food is either 'safe' or 'unsafe' without qualification. Perhaps consumers are too sophisticated to be given blanket reassurances of safety, and now expect agencies to provide them with information that allows them to come to their own conclusions. It may benefit industry if those at greatest risk of disease are not consuming higher risk food products, and may lessen public outrage if consumers suffer illness after making an informed decision to eat a higher risk food.

Such selective warnings are not without precedent in Australia. The Australian New Zealand Food Authority, and many State health departments issue brochures for pregnant women advising of the dangers of eating foods associated with listeriosis, such as pate and soft cheeses. The New South Wales Health Department has recently issued warnings advising against the consumption of undercooked hamburger mince. It is consistent to give similar advice in relation to raw seafood.

While not providing a guarantee, there is evidence that cooking oysters can lessen the risk of illness, and specific information on cooking methods, times, and temperatures should be provided to consumers<sup>8,9</sup>.

In summary, we are very likely to see similar reports in the future. It will take

many years to provide the infrastructure required to mitigate the effect of urban development on the many vulnerable oyster harvesting areas, and it will take time to validate viral monitoring programs. In the interim, compliance with existing water quality guidelines and consumer and patient education efforts, may be the best way to protect public health and the oyster industry.

*The views expressed in this commentary are those of the author and do not necessarily represent official New South Wales Health Department policy.*

### *References*

1. Hedberg CW, Osterholm MT. Outbreaks of food-borne and waterborne viral gastroenteritis. *Clin Microbiol Rev* 1993;6:199-210.

2. Jiang X, Graham DY, Wang K, Estes MK. Norwalk virus genome cloning and characterisation. *Science* 1990; 250:1580-1583.
3. Christensen ML. Human viral gastroenteritis. *Clin Microbiol Rev* 1989;2:51-89.
4. Doane FW, Anderson N. Electron microscopy in diagnostic virology. New York, NY:Cambridge University Press; 1987:15.
5. *Comm Dis Intell*. Hepatitis A outbreak in New South Wales. 1997;21:46.
6. The Australian Supermarket Institute. The Australian Supermarket Shopper - Attitudes and Behaviour 1996-1997. In *The Australian Grocery Shopper* 1996-7.1.
7. Bird P. Purification technology for New South Wales Oysters. New South Wales Health Department. 1994. 3rd Edition. ISBN 0731029577.
8. Kohn MA, Farley TA, Ando T, *et al*. An outbreak of Norwalk virus gastroenteritis associated with eating raw oysters. *JAMA* 1995;273:466-71.
9. McDonnell S, Kirkland KB, Hlady WG, *et al*. Failure of cooking to prevent shellfish-associated viral gastroenteritis. *Arch Intern Med*.1997;157:111-6.