Regional Public Health
Better Health For The Greater Wellington Region

Executive Summary

Guidelines for the Management of Norovirus Outbreaks in Hospitals and Elderly Care Institutions

Ministry of Health – January 2009

This Executive Summary has been prepared by Regional Public Health, Hutt Valley DHB, for use by Long Term Care Facilities in the initial responses to serve as a comprehensive reference document.

July 2010

1. The Importance of Outbreaks in Institutional Settings

Institutional outbreaks of norovirus involving hospitals and elderly care facilities (LTCFs) are important. Elderly care facilities accounted for over 85% of all institutional outbreaks reported during 2007. In the financial year 2009 –2010 there were 28 outbreaks in hospitals and LTCFs in the Wellington region; of these 82% occurred in LTCFs. Hospital patients and nursing home residents represent high-risk populations for the transmission of gastrointestinal illness because they are likely to be relatively immuno-suppressed and experience a more complicated clinical course. Outbreaks spread via person-to-person transmission among residents and patients and are complicated by enclosed living conditions and immobility. In LTCFs, faecal incontinence and reduced mental function may present additional challenges to outbreak control.

An outbreak is defined as 'two or more cases of illness linked to a common source'. An outbreak of norovirus should be suspected where two patients or residents show signs of gastroenteritis in different areas of the facility and for which there is not an obvious cause.

2. Clinical Features of Norovirus Infection

Gastroenteritis caused by norovirus (previously called Norwalk-like viruses or small round structured viruses) is characterised by acute onset of nausea (81%), vomiting (54%), abdominal cramps (72%) and diarrhoea (85%). Vomiting is more common in the young, and diarrhoea more common in adults. Constitutional symptoms such as fever (51%), rigors, muscle and joint pain, and headache are also common. Data from New Zealand outbreaks estimate that the incubation period for illness is 10 to 50 hours (median 32 hours) and duration of illness for individuals 2 to 171 hours (median 36 hours). It is likely that viral excretion precedes the onset of illness by several hours. High levels of asymptomatic infection have been documented. Viral excretion in stools persists well beyond the symptomatic phase of illness. Immunity following infection is short-lived and antibody levels correlate poorly with the risk of future norovirus infection.

There is often much variability in symptoms during a norovirus outbreak. Some persons present with watery diarrhoea, others with only loose bowel motions. Some cases suffer from vomiting only. There is usually a similar range in the severity of the illness and its duration.

3. Routes of Transmission and Risk of Infection

Routes of infection

Genogroup I and II noroviruses are pathogenic only in humans. Faecal–oral spread is the primary mode of transmission although there can be airborne spread through aerosolised vomit and also spread via fomites (inanimate articles). Norovirus is often introduced by an index case who is a food handler, other staff member, new resident, or short-term visitor to a LTCF. On occasion, asymptomatic carriage by staff with sick family members has caused large norovirus outbreaks. (Contaminated water supplies should be considered as another possible source of infection in areas not on reticulated supply.)

Noroviruses are environmentally hardy, withstanding heating to 60^{o}C, freezing and chlorine concentrations of up to 10ppm. In an institutional setting a major risk of transmission is associated with environmental contamination with norovirus. In particular, door handles appear to be efficient vectors for viral transfer.

Risk of infection

Noroviruses are highly infectious. The infectious dose is thought to be very low, possibly as low as one viral particle, the ingestion of which has been estimated to result in a 21% probability of infection in a susceptible individual. The stools of cases typically contain 109 viral particles per millilitre during the diarrhoeal phase of illness.

4. Reporting an Outbreak of Suspect Norovirus

Report all outbreaks on suspicion to Regional Public Health's Disease Control Team. Do **NOT** wait till numbers of cases escalate, but follow the advice in section 1 above.

RPH will gather essential data on your LTCF so we can understand your environment and the size of resident and staff populations. We will check with you to ensure that all basic infection control measures have been put into place. Thereafter RPH will provide outbreak monitoring and advice on a daily basis. RPH will also notify the relevant DHB's infection control nurses, who may give further advice and may undertake a site visit if needed.

5. Obtaining Faecal Specimens

Attempt to obtain faecal specimens as soon as possible (never vomitus as it cannot be tested for norovirus). Ideally stool samples should be taken during the symptomatic phase of the illness (0 to 3 days from onset). However, excretion persists for some days (even up to 10 days has been reported). In addition to being tested for norovirus, stools should be tested for other common viruses (rotavirus, adenovirus), and common bacterial pathogens and parasites (Giardia and Cryptosporidium) that cause gastrointestinal illness, to exclude these organisms. Stool sampling must first be discussed with RPH for advice and to obtain an ESR Outbreak Number, without which ESR will not test specimens for norovirus. In small outbreaks, the number of clinical samples obtained may be limited by the low number of cases. For propagated outbreaks, the strategy is to test in batches of three until a positive result is obtained. Once the presence of norovirus is confirmed, subsequent specimens from new cases are usually not processed by ESR.

6. Management of Patients and Residents with Norovirus Infection

The aim of management is to minimise the exposure of cases to other residents, patients, staff, and visitors, particularly during their symptomatic phase when excretion of virus is likely to be at its highest. It also involves keeping a norovirus outbreak case log on all cases, including staff members. RPH will provide a suitable log if required (RPH has to report on a minimal data set to ESR).

Clinical assessment

- Put any resident with diarrhoea or vomiting into an isolation room immediately, preferably a single room with dedicated ensuite or toilet. Post isolation signage at the door or wherever the isolation zone begins.
- Send any staff with diarrhoea and vomiting home immediately.
- Consider cohorting residents directly exposed to a case for at least 3 days.
- Segregate all new admissions from those who may be about to develop symptoms.

Hand hygiene

- This is the most important hygienic measure for preventing infection spread.
- For hand washing best practice wash hands in running water, vigorously rubbing with soap for at least 20 seconds (the use of a nail brush is not recommended).
- The drying time required to reduce the transfer of germs varies with each drying method. For single-use paper towels rub hands on two towels, drying for 10 seconds on each (total 20 seconds). For single-use cloth roller towels rub hands on two sections of the towel, drying for 10 seconds on each section (total 20 seconds).
- Hand hygiene should be performed after any contact with the intact skin of a resident or with environmental surfaces in their vicinity.

'Risk' activities resulting in hand contamination include:

- Going to the toilet.
- Cleaning toilets and bathrooms.
- Handling potentially soiled clothes and bed linen.
- Cleaning up after vomit or faecal accidents.
- Handling cleaning accessories such as cloths, buckets and mops.
- Removing gloves.
- Touching any environmental surface in an isolation room of a person with norovirus.
- Touching surfaces that are subject to high levels of manual contact by patients, residents, staff and visitors such as rails and door knobs.

Note that hands should also be washed and dried after every break and on entry to the food preparation area.

- In an outbreak, encourage people to use alcohol gel only after they have washed and dried their hands thoroughly.
- Wearing gloves is not a substitute for hand hygiene. Gloves in themselves confer no protection against cross-contamination – like bare hands, they may transfer microbes to other environmental surfaces. When using gloves, wash and dry hands before and after significant contact with the resident, and likewise replace gloves before and discard them after such contact. Hands must be washed after activities involving handling of contaminated items and after removal of gloves.

Patient movement and transfer

- Do not move patients out of isolation until at least 48 hours after sickness ceases or unless it is essential.
- Do not transfer symptomatic cases to other parts of the LTCF, hospitals or other LTCFs for at least 48 hours after symptoms cease. Even at this point, the receiving institution should be made aware of the case's illness before transfer so that extra infection control measures can be undertaken.

Closure of facility to residents and admissions

- Where outbreak control is difficult and significant ongoing risk of norovirus infection exists, closure of the LTFC to new admissions or residents may need to be considered.
- Criteria for considering closure will include both of the following:
    - There are ongoing cases despite full implementation of outbreak control measures.
    - There is a high level of debility among new arrivals.

7. Management of Staff

Staffing of isolation room(s)

- Prevent non-essential staff from entering isolation rooms.
- Group together all staff who look after cases so that the minimum number of staff are exposed to cases.
- Staff having direct contact with symptomatic cases in isolation rooms should wear a gown / apron and gloves. If the case is vomiting, they should also wear a P2/N95 particulate respirator mask.
- Vent airflow, if feasible, to the exterior of the building from the isolation rooms, such as by opening exterior windows.
- No staff or visitors should enter the isolation room unless familiar with isolation procedures. Highlight the importance of hand hygiene after glove removal to staff and visitors.

Management of infected staff

- The loss of a large number of staff through illness may place a significant burden on those remaining at work. However, exclusion of the ill is still an important strategy.
- Operate a sickness log to record details of ill staff, including their symptoms when they became ill and their date of return to work.
- Exclude staff at the first suggestion of illness, such as nausea or abdominal pain.
- Apply the appropriate exclusion to ill staff; allow staff to return to work after they have been symptom free for at least 48 hours.

- Emphasise hand hygiene and highlight information on how to deal with vomit or faecal accidents to sick staff that are going home so that the risk of household transmission of norovirus infection is minimised.
- Further counsel returning staff on the importance of hand hygiene.

8. Management of Visitors

- Minimise visits to symptomatic cases.
- Prevent visitors of a suspected case from visiting other patients or residents.
- Visitors must comply with all isolation procedures. Supervise them when they are putting on and removing gown and gloves to ensure hand hygiene is thorough.
- Tell visitors of a suspected case of norovirus infection that they must not visit patients or residents in other LTCFs for at least three days.

9. Cleaning and Disinfection

- Undertake enhanced cleaning of the rooms of cases, their toilet and bathroom areas, and environmental surfaces exposed to hand contact such as telephones, hand rails, and door handles.
- Household bleach is a high-level disinfectant capable of killing norovirus. Other disinfectants like ethanol, anionic compounds, quaternary ammonium and phenolic disinfectants are not recommended.
- To work properly, bleach disinfectant needs:
    - Enough time to kill – at least 30 minutes' contact time.
    - Sufficient strength or concentration, > than 10ppm.
    - A surface free of organic material such as vomit or faeces.
- Dilute supermarket bleach (sodium hypochlorite) to achieve a 0.1% solution.
- Make up a fresh solution of the bleach each day and discard it if not used within 24 hours.

Recipes to achieve a 0.1% bleach solution using sodium hypochlorite

Original strength of bleach (% sodium hypochlorite)	Volume of bleach needed (milliliters)	Volume of water needed (milliliters)	Total volume (milliliters)	Parts per million (ppm) achieved
1%	1000	9000	10,000	1000
2%	500	9500	10,000	1000
3%	333	9677	10,000	1000
4%	250	9750	10,000	1000
5%	200	9800	10,000	1000

- An alternative to hypochlorite is Virkon (accelerated potassium peroxymonosulphate), which is less corrosive than hypochlorite, is safe to use both as a spray and surface decontaminant and is virtually odourless.

Cleaning Equipment

Cloths

- For general cleaning of the environment, use disposable cloths and dispose of them in a biohazard bag.
- Use separate cloths of an identifiable colour for cleaning higher risk areas such as toilet and bathroom areas. Restrict their use to these areas only. Discard after use.

Mops

- After use, soak reusable mops in 0.1% hypochlorite solution and hot launder them as well as cloth mop heads.

Personal protective equipment

- Staff cleaning up faecal or vomit accidents or being exposed to toilet facilities of cases, **MUST** have adequate personal protection, i.e. disposable gloves, disposable gown, and a particulate respirator mask (N95) if in the presence of vomiting cases or where aerosols may be generated (e.g. cleaning the toilet bowl).

Cleaning of toilets, bathrooms and vacated rooms

- Solutions exceeding 1000 ppm chlorine may be used in bathrooms, particularly if there have been faecal or emetic accidents.
- Pay special attention to cleaning toilet seats, bowls, toilet paper dispensers, door handles and latches, tap faucets and handles.
- When a resident or patient vacates their room, clean it thoroughly. Pay special attention to cleaning soiled mattresses and soft furnishings including drapes and carpets. Furnishings can be placed outside to expose them to sunlight to assist disinfection.
- Do not machine buff hard floor surfaces that have become contaminated as norovirus particles may then become airborne: use a wet vacuum cleaner if possible. Dry vacuuming of carpets and soft furnishings is discouraged as it may re-suspend environmental virus in the air.
- Clean both staff and public toilets more frequently, every two hours or as required.
- When residents or patients who have been cases vacate their rooms, clean environmental surfaces using bleach, or Virkon, and disposable cloths (or steam clean soft furnishings). Launder curtains.

Cleaning up vomit and faeces

- Vomiting in particular confers significant risk of infection to those exposed to aerosols.
- Usher staff, apart from those necessary to attend to the case, and others quickly from the room or, if the incident occurred in a corridor, cordon off the area.
- Involve minimal staff in the clean-up operation. If possible, cohort staff involved in cleaning up contaminated material to limit the exposure of other staff.
- If possible, open windows and doors to direct the airflow to the outside of the building.
- Staff should wear disposable gloves, a plastic disposable apron and a particulate respirator mask (N95) if aerosols are likely to be present.
- Clean up by removing soiled clothing in an impermeable and appropriately coloured bag for linen.
- If possible, remove soiled furniture to a safe and isolated place for thorough cleaning.
- Where there is faecal soiling, using hypochlorite alone will not adequately decontaminate surfaces. It is important to first clean the soiled area with detergent and hot water, using a disposable cloth, to remove all organic debris - then disinfect with hypochlorite.
- If possible, disinfect the contaminated and surrounding areas with 1000ppm (0.1%) hypochlorite solution or 1% Virkon.
- Wash and dry hands thoroughly following the hand hygiene protocol.
- Restrict access to the contaminated area for at least 30 minutes.

Cleaning soft furnishings and fabrics

- Use Virkon on these fittings but its penetration into fabrics may be limited and organic material such as vomit may reduce its effectiveness.
- Clean contaminated soft chairs, mattresses, and carpets (that are not bleach resistant) first with hot water and detergent. Subsequently steam clean them.
- Handle contaminated curtains, soiled linen and bedclothes using protective clothing (apron and gloves).
- Ideally place the linen in a colour-coded linen bag (e.g. yellow skip) to warn of contamination. Put any waste into waste bags inside the case's room. Replace linen and waste bags at least daily or when two-thirds full.

Laundry

- Laundry may be contracted out or laundered on site.
- If contracted out, insure the contractor knows about the outbreak so that they can protect their staff.
- Hot-wash soiled clothes or linen.
- Protect laundry staff with disposable gown, gloves and mask.

Food service

- Send food handlers home at the first sign of any illness.
- Only allow dedicated staff into the kitchen and food preparation areas.
- Menus and meal trays do not need special treatment, but plates and cutlery need a hot wash in a commercial machine.