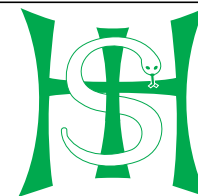


Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

Journal of Hospital Infection

journal homepage: [www.elsevierhealth.com/journals/jhin](http://www.elsevierhealth.com/journals/jhin)

# Lessons learned from a prolonged and costly norovirus outbreak at a Scottish medicine of the elderly hospital: case study

J. Danial<sup>a,\*</sup>, S. Ballard-Smith<sup>b</sup>, C. Horsburgh<sup>a</sup>, C. Crombie<sup>c</sup>, A. Ovens<sup>c</sup>,  
K.E. Templeton<sup>c</sup>, A. Hardie<sup>c</sup>, F. Cameron<sup>a</sup>, L. Harvey<sup>c</sup>, J. Stevenson<sup>d</sup>,  
I. Johannessen<sup>c</sup>

<sup>a</sup> Infection Prevention and Control Team, Royal Infirmary of Edinburgh, Edinburgh, UK

<sup>b</sup> NHS Lothian Directorate of Nursing, Waverley Gate, Edinburgh, UK

<sup>c</sup> Specialist Virology Centre, Royal Infirmary of Edinburgh, Edinburgh, UK

<sup>d</sup> NHS Lothian Public Health, Waverley Gate, Edinburgh, UK

## ARTICLE INFO

### Article history:

Received 1 September 2014

Accepted 1 February 2016

Available online xxx

### Keywords:

Norovirus

Surveillance

Outbreak

Economic loss

Quality improvement

## SUMMARY

**Background:** Norovirus outbreaks are a major burden for healthcare facilities globally.

**Aim:** Lessons learned to inform an action plan to improve facilities as well as responses to norovirus within the medicine of the elderly (MoE) hospital as well as other NHS (National Health Service) Lothian facilities.

**Methods:** This study investigated the impact of a prolonged outbreak at an MoE hospital in one of the 14 Scottish health boards between February and March 2013.

**Findings:** In all, 143 patients (14.80 cases per 1000 inpatient bed-days) and 30 healthcare staff (3.10 cases per 1000 inpatient bed-days) were affected clinically and 63 patients were confirmed virologically. Restricting new admissions to affected units resulted in 1192 lost bed-days. The cost due to lost bed-days in addition to staff absence and management of the outbreak was estimated at £341,534 for this incident alone. At certain points during the outbreak, the whole facility was closed with resulting major impact on the health board's acute care hospitals.

**Conclusion:** Due to the outbreak, new measures were implemented for the first time within NHS Lothian that included floor-by-floor (instead of individual) ward closures, enhanced cleaning with chlorine-based products throughout the hospital, reduction in bed capacity with enhanced bed-spacing and interruption to direct admissions from the Board's general practice surgeries, and temporary suspension of visitors to affected areas. Together with regular communication to staff, patients, relatives, and the public throughout the outbreak and good engagement of staff groups in management of the incident, the outbreak was gradually brought under control.

© 2016 The Healthcare Infection Society. Published by Elsevier Ltd. All rights reserved.

\* Corresponding author. Address: Infection Prevention and Control Team, Royal Infirmary of Edinburgh, 51 Little France Crescent, Old Dalkeith Road, Edinburgh EH16 4SA, UK. Tel.: +44 (0)131 242 6067; fax: +44 (0)131 242 6008.

E-mail address: [janathan.danial@nhslothian.scot.nhs.uk](mailto:janathan.danial@nhslothian.scot.nhs.uk) (J. Danial).

<http://dx.doi.org/10.1016/j.jhin.2016.02.002>

0195-6701/© 2016 The Healthcare Infection Society. Published by Elsevier Ltd. All rights reserved.

## Introduction

Norovirus is a leading cause of outbreaks of gastroenteritis worldwide, including in the UK.<sup>1–3</sup> Three norovirus genogroups (GI, GII, GIV) are known to infect humans; however, most norovirus outbreaks of gastroenteritis worldwide are caused by GII genotypes, most notably genocluster 4 (GII.4).<sup>4</sup> In the past 15 years, several distinct variants of GII.4 have emerged every few years, causing five pandemics of gastroenteritis.<sup>4</sup> Most notable recently is the emergence of norovirus variant GII.4 Sydney 2012 which was first reported in Sydney, Australia, and has subsequently spread to many countries, including Scotland.<sup>5</sup> Norovirus is the most frequent cause of gastroenteritis in the community; therefore, keeping the virus from being introduced into healthcare settings is difficult, especially medicine of the elderly (MoE) facilities in winter months.<sup>6–8</sup> Control measures are implemented to minimize the spread of virus within and between hospital wards.<sup>9,10</sup>

In the UK, large open 'Nightingale' wards are still present in many older UK hospitals, beds being separated by privacy curtains only.<sup>11</sup> The configuration and layout of such wards presents considerable challenges when managing norovirus outbreaks due to the limited availability of single rooms, toilet facilities and handwash basins as well as patients sharing communal dining rooms and ward kitchens. In the short term, such wards require an options appraisal for reconfiguration so that modern infection prevention and control (IPC) standards can be met. In the medium to long term, such wards require a complete reprovision. In the longer term, these older hospitals will gradually be replaced with new facilities that better meet modern IPC standards.

The current study illustrates lessons learned from, and the cost of, a prolonged norovirus outbreak in open Nightingale wards at one of our main MoE hospitals (Liberton Hospital, Edinburgh, built in 1968). Active surveillance was carried out to determine incidence, overall economic cost, and the effectiveness of control measures. Currently, the evidence base on the impact and management of prolonged norovirus outbreaks in Nightingale hospital wards is very limited, and the study seeks to contribute to the literature with a view to inform best IPC practice.

This descriptive study aims to: describe the epidemiology of this prolonged outbreak; outline costs associated with the outbreak; discuss reasons why the outbreak was hard to control; highlight lessons learned for control of future outbreaks. The effectiveness of the control measures has not been scientifically measured.

## Methods

### Study population

Liberton Hospital has ~170 acute inpatient beds. About nine acute 'functional care units' were monitored, including ~167 inpatients. On average, the number of beds on a ward is 20, and the hospital is laid out such that two adjoining wards are located on each floor with shared dining facilities in the middle of the floor. Nursing, medical, and other staff members were included in the population at risk. The yearly inpatient activity at this hospital for the period April 2012 to March 2013 was 622.

### Clinical definitions

Cases of norovirus gastroenteritis typically present with an abrupt onset of vomiting (more than twice in 24 h) and/or three or more episodes of watery diarrhoea in a 24 h period, with the patient not taking antibiotics, regular laxatives, or suppositories/enemas. Other symptoms may include fever, abdominal cramps, headache, and lethargy. These incidences are alerted to the infection control team or the on-call virologist. An outbreak of gastroenteritis is defined as two or more cases in a ward with onset dates within seven days of each other. Confirmation of a norovirus outbreak in a ward requires the detection of a norovirus PCR-positive stool or vomit sample.

### Surveillance and outbreak investigation

Infection prevention and control nurses (IPCNs) become aware of gastroenteritis outbreaks during ward rounds or are alerted to incidents by ward nurses. Ward staff collect detailed records of possible outbreaks. IPCNs fill in outbreak record sheets, which include number of patients and staff affected, date of first case, date of area closure, date opened, total beds in ward, vacant beds and any norovirus polymerase chain reaction (PCR)-positive samples.

Detection of norovirus in stool or vomit is essential for confirming norovirus outbreaks.<sup>12</sup> PCR test results guide bed management so that negative and positive results are equally important to IPCN and ward teams.<sup>9</sup> Within NHS (National Health Service) Lothian, a seven-day service was implemented in 2012 for both the duty IPCN and virology laboratory service, which work in concert to prevent and control (viral) infections. In line with this is the observation that the virology laboratory service processed 6000 samples for norovirus testing during 2012/13, which was double the number of samples processed during 2011/12 (Figure 1). Equally, with implementation of increasingly automated molecular methods, the turnaround time for test results has been reduced to ~90 min following receipt of samples.

### Data collection

All faecal and vomit samples received between February 1st, 2013 and March 31st, 2013 were included in the study. Part of the dataset was obtained from IPCNs and the other part extracted from the laboratory information system, APEX (iSOFT, Banbury, UK). Data gathered for each patient were as follows: age, sex, location, specimen type, and real-time PCR result [including cycle threshold (C<sub>T</sub>) value, if positive]. Laboratory turnaround time was calculated from the actual electronic record at sample reception until result authorization in APEX. All the data were recorded in a central database and updated regularly by a designated data auditor.

### Statistical analysis

Data were entered and stored in an Excel (Microsoft) database. The dataset was analysed using Microsoft Excel data analysis tool.

### Economic analysis

In the current study, the cost of the norovirus outbreak was calculated in pounds sterling. The cost implications due to

Download English Version:

<https://daneshyari.com/en/article/6121817>

Download Persian Version:

<https://daneshyari.com/article/6121817>

[Daneshyari.com](https://daneshyari.com)