Norovirus Infection in Health and Social Care Settings
Judy Potter, Royal Devon and Exeter NHS Foundation Trust, UK
A Webber Training Teleclass

Objectives
• Recognise the clinical presentation of norovirus
• Describe the mechanisms of transmission for norovirus infections
• Discuss the impact of norovirus outbreaks on the individual and the organisation, using local experiences in acute healthcare as examples
• Discuss interventions designed to control norovirus transmission

Norovirus infection in health and social care settings

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Aetiology
• Small Round Structure Virus (SRSV)
• Single stranded, non-enveloped RNA virus belonging Caliciviridae family
• AKA Norwalk, Norwalk-like virus

Clinical features
• Incubation 24 – 48 hours
• Affects all age groups
• Onset gradual or abrupt
• Nausea
• Abdominal cramps
• Myalgias, malaise and headaches
• Low grade fever (about 50%)
• Vomiting (often projectile) and diarrhoea

Route of transmission
• Person – person
  – Faecal-oral
  – air-oral/mucous membrane
• Environment to person
• Foodborne

Why are SRSVs such good pathogens?
• Effectively dispersed - airborne
• Relatively resistant in the environment
• Low infectious dose (10 – 100 vps)
• High attack rate - 50%
• Short lived immunity
• Continued shedding for weeks after resolution of symptoms

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Principles of outbreak prevention and management

- Single cases
  - Early identification
  - Isolation/segregation of suspected case from others
  - Restrict movement of exposed patients until incubation period passed
  - Environmental decontamination
  - Communication to other care providers if transfer required
- Outbreak
  - Avoid admissions to and transfers from the outbreak area

Why do SRSVs spread so easily in communal care settings?

Additional challenges in social care settings

- IPC expertise often not as readily available as in a hospital
- It is a home, not a hospital, and the environment reflects this
  - Soft furnishings
  - Difficulty cleaning
- Days rooms, dining rooms and activity areas
  - Exposure of large numbers of residents if index case symptomatic in communal area

Laboratory reports in England and Wales, by HPA region 2000-2012

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Source: The Health Protection Agency Laboratory Reports (LabBase2)
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Laboratory reports by age at diagnosis, 2000-2012

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Why is this such a challenge in the South West?

Older population
- Increase in retired population
- Increase in frail older people
- Increase in delirium and dementia
  - 560 in-patients or 2/3rds of all patients are over 65yrs
  - 1/3rd of our patients are over 80yrs
  - ½ all adults will be disorientated during their stay
- Makes source isolation incredibly challenging and, sometimes, impossible in both health and social care settings

Population of 80yrs + in Exeter and East Devon

Norovirus is a mild, self limiting illness?
- Severe outcomes are highlighted by Desai et al (2012) in relation to Genogroup 2 Genotype 4
- Local experience:
  - Duration of symptoms in hospital = mean 5 days
  - Extended LOS
  - Dehydration > rehydration > ‘relapse’ about 3 days post-resolution
- Some examples of impact on elderly service users:
  - Perforated oesophagus – ITU 2 weeks
  - Bleeding oesophageal varices
  - Haematemesis
  - Aspiration pneumonia
  - #NOF

Does Norovirus infection matter?
After all, it’s a ‘mild, self limiting illness’

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Epidemiology of outbreaks in Exeter/East Devon

2009-10

Impact/Lost Opportunities

- 2350 bed days lost over 5 months
- 740 elective patients cases cancelled on the day of admission
- Length of stay increased, particularly if patients were due for transfer to other institutions such as care homes or community hospitals when discharge was usually delayed until the ward reopened.
  - Reluctance from social care to even visit to assess patients on an affected ward

Impact on staff

Diarrhoea/vomiting Headcount against number of wards closed due to norovirus

Preparation for winter 2010-11

- HPU to provided 'early warning data'
- All ward and dept matrons received a written update
- Power point presentation sent to all Lead Nurses for cascade to clinical teams
- Additional updates provided for link nurses
- Additional updates provided for medical staff
- Business case for 'outbreak' scrubs approved and scrubs purchased
- Additional cleaning services planned for affected wards
- Outbreak resources on intranet updated
- Cross template working reviewed and plans put in place for 'lock down' if one ward affected on a template.

Patient and Staff Movement

- Cleaning staff - strictly allocated to closed ward only
- Doctors and AHPs - visit closed ward last or specific staff designated to work in affected areas
- Single bay closure - where possible, nurses allocated to that bay only
- No discharges to care homes/community hospitals from affected bays/wards unless patient has had and recovered from NV infection. Even this is undertaken with discussion between infection control team and receiving area.
- Movement of patients from ward to ward to cohort is avoided unless capacity for emergency admissions is threatened - last resort.
- Symptomatic staff advised to remain absent until symptom free for at least 48 hours.

Reopening affected wards

- Decision to re-open made by IPCT/DIPC only
- Reopened 72 hours after cessation of uncontained symptoms (contained=isolated in side room)
- Specialist cleaning team given 24 hours notice of need for terminal clean wherever possible
- Terminal clean usually completed within 1 working day
- Chlorine releasing agent used as per national guidelines
- H2O2 vapour used if C.difficile also a factor.

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Impact

Some key issues remained
- Possible cases still got missed in medical admission wards but less frequently
- Movement of patients remained a significant issue
- Apparent relapse on day 3 or later remained a feature for elderly patients
- Swift transfer out of AMU to isolation rooms challenging over Christmas/New Year period due to competing pressures caused by flu.
- No outbreaks in other organisations as a result of transfers from RD&E.

And then......

Why?

Summertime complacency

- Focused work
  - Admissions ward staff
  - Site Practitioners
  - IPCT - frequent review of admissions

New guidance - 2012

Two key differences to local practice:
- Manage successfully in small cohorts i.e. close bays not wards
- Reopen following terminal cleaning at 48 hours after resolution of last case

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Local practice regarding extent and duration of closure

- An early whole ward closure approach is taken for any ward where either:
  - the source cannot be clearly identified at the outset and therefore it is unknown how many other patients might have been exposed, OR
  - there is more than one case already at the time of reporting, OR
  - the first patient identified is confused and has wandered around the ward and might have exposed other patients outside their bay, OR
  - the first patient had been sharing toilet facilities with patients from other bays.
- Duration of closure - until 72 hours after resolution (or containment) of last case

Local experience - winter 2012

- 14 of the 26 outbreaks resulted in full ward closure at the onset,
  - 5 of the 26 wards only one bay was closed initially but spread to other bays resulted in subsequent full ward closure.
  - Full ward closure at onset resulted in shorter duration of closure = 2.1 days less
- 7 outbreaks confined to one bay only
  - cohort nursing was able to be implemented - 24 hours
  - transfers out of the whole ward were restricted

Impact

- 285 symptomatic patients
- 1036 lost bed days
- So was this failure?
  - No spread from medical wards to surgery
  - No elective activity cancelled as a result of norovirus outbreaks
  - No known spread to care homes

Conclusion

- Without a norovirus vaccine, and with an increasing elderly population, norovirus outbreaks will continue to be a challenge
- Still not sure if it is luck or judgement when the number of outbreaks is lower than the previous year - confounded by new strains
- Duration of ward closure can be less with early ward closure
- It is possible to implement ward closure whilst minimising impact on ‘business as usual’
- Not all national guidance is helpful - have to consider local experience/population