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Clostridioides difficile

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Session Outline

- Overview for primary care
- Risk factors and a patient story
- Routes of transmission
- Prevention
- Management and Treatment
- Infection Prevention and Control Precautions
- HCAI Surveillance and benefits of RCA

Clostridioides difficile

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Clostridioides difficile (formerly known as *Clostridium difficile*) is an anaerobic, spore forming, gram positive bacillus able to colonise the gut of humans and animals, especially where the normal gut flora has been altered by antibiotic treatment (Wilson 2019)

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Overview

Clostridioides difficile (C. diff) is present in the gut (bowel) of up to 3-5% of healthy people and 66% of babies as part of their normal gut flora. However, when antibiotics disturb the balance of bacteria in the gut, *C. difficile* can multiply rapidly producing toxins causing diarrhoea or colitis.

C. diff produces two major toxins (A and B) that are linked to its pathogenicity (ability to cause infection). The presence or absence of these toxins is detected as part of the *C. diff* testing process in the Laboratory (IPC 2021).

Overview

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C. diff has been associated with outbreaks in hospitals & care homes. It is, therefore, essential that good infection prevention and control measures are undertaken so that transmission does not occur in any health or social care setting.
There are many different strains of *C. diff,* 027 has been associated with large outbreaks but there has been a decline in this strain in recent years possibly due to antimicrobial stewardship (Wilson 2019)

Patient Story……

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- Mrs Vimto aged 90
- History of TIA, # Pelvis & metatarsal, Bronchiectasis, COPD, Hiatus Hernia, Osteoporosis
- Medication – Prednisolone, Laxido, Omeprazole.
- Somerset resident cared for by a Somerset GP and Nursing Home
- Flucloxacillin 500mg QDS 1 Week commenced for a Pilonidal Cyst 10th June
- Loose stool commenced on the 24th June, sample sent
- Giardia and Cryptosporidium – negative 24th June.
- C diff diagnosis - Vancomycin 125mg Px QDS PO 14-day course prescribed 25th June.
- Delay in treatment as Vancomycin still not received from Pharmacist 28th June.
- No hospital admissions between 25th June and 2nd August.
- Mrs Vimto was still experiencing loose stool and never fully recovered, sample sent again 2nd August. Relapse in C diff prescribed Vancomycin 125mg Px QDS PO 14 day course

C. diff conditions

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There are two types of *C. difficile* conditions:

- ***C. diff* colonisation** - bacteria are present in the bowel, not causing symptoms & not producing toxins.

Patients who are colonised are at high risk of progressing to infection

- ***C. diff* infection (CDI)** - bacteria are present and producing toxins, causing symptoms which can be mild to severe, including life-threatening pseudomembranous colitis, toxic megacolon and even perforation of the bowel.

C. diff is usually associated with, and triggered by, the prior use of antibiotics prescribed as treatment for, or to prevent infection (prophylaxis) (IPC 2021).

Risk factors

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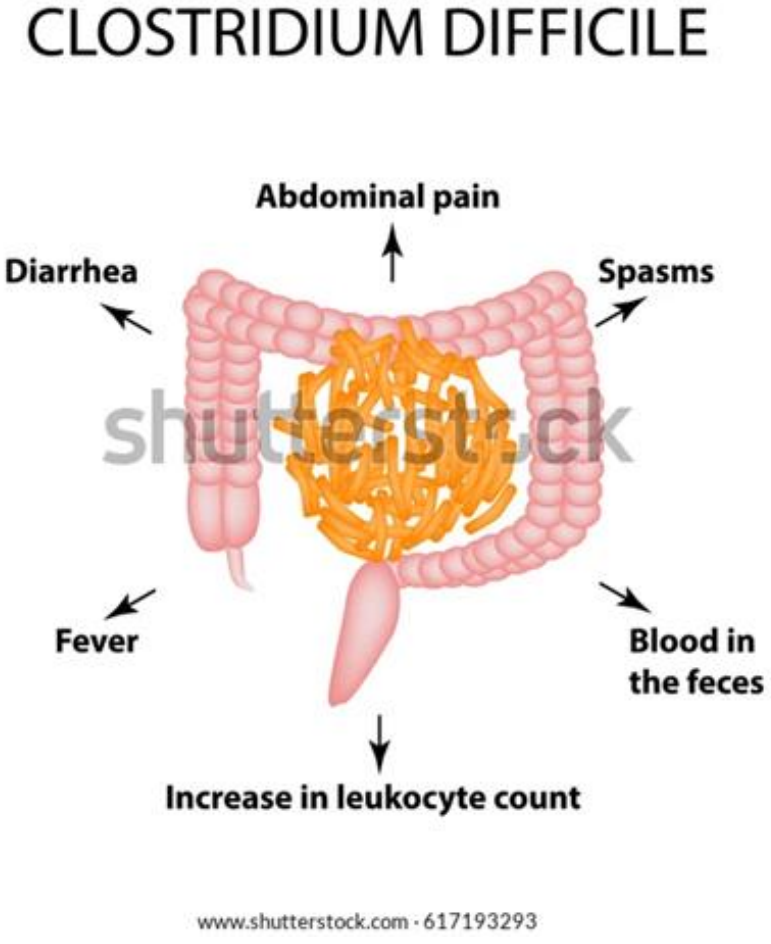
- **Age** - incidence is much higher in those aged over 65 years
- **Underlying disease** - those with chronic renal disease, underlying gastrointestinal conditions and oncology patients
- **Antibiotic therapy** - patients who are receiving or who have recently received antibiotic treatment (within 3 months), especially broad-spectrum antibiotics such as cephalosporins, e.g. cefuroxime, quinolones, such as, ciprofloxacin, co-amoxiclav or clindamycin. *C. difficile* has been associated with oral, intramuscular and intravenous routes of administration of antibiotics
- **Recent hospital stay** - patients who had had lengthy stays or frequently in hospital
- **Bowel surgery** - those who have undergone bowel surgery
- **Other medication** - patients receiving anti-ulcer medications, including antacids and proton pump inhibitors (PPIs), e.g. omeprazole, which are used for treating reflux
- **Nasogastric tubes** – patients requiring nasogastric tubes
- **Previous history of colonisation or infection with *C. diff*** - patients are at greater risk of developing *C. difficile* infection (CDI)

Symptoms



- Explosive, foul-smelling watery diarrhoea, which may contain blood and or mucus
- Abdominal pain and fever due to the toxins causing fluid loss from the gut and cell damage
- Dehydration which can be severe due to fluid loss

In most patients, the illness is mild and recover. Occasionally, patients with CDI may develop a severe form of the infection called pseudomembranous colitis which can cause significant damage to the large bowel resulting in perforation, peritonitis and death.

Routes of Transmission

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C. diff produces microscopic spores, present in the diarrhoea. The spores are resistant to air, drying and heat, and can survive in the environment for months, even years.

The main routes of transmission of *C. diff* spores are:

- Contaminated hands of staff and patients
- Contact with contaminated surfaces or equipment, e.g. toilet flush handles, toilet assistance rails

Prevention of *C. diff*

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- **Prudent antibiotic prescribing:**
  - Antibiotics should not be prescribed unless necessary
  - broad spectrum agents should be substituted by those with a narrower spectrum of activity
  - Courses of antibiotics should be as short as the clinical condition allows
  - Use of antibiotics associated with CDI should be avoided where possible
- **Follow the Somerset Prescribing Policy**

  https://www.somersetccg.nhs.uk/wp-content/uploads/2021/07/Managing-common-infections-Guidance-for-Primary-Care-July-21-v1.1-final.pdf

- **Hand hygiene** with liquid soap, warm running water and dried with paper towels. Alcohol handrub should not be used as it is not effective at killing *C. diff* spores
- **Use of appropriate personal protective equipment,** e.g. disposable gloves and apron
- **Reducing the number of spores in the environment** by thorough cleaning and then disinfecting with a sporicidal product

SIGHT

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SIGHT mnemonic (adapted from *Clostridium difficile* infection: How to deal with the problem (DH 2008)

S	**Suspect that a case may be infective where there is no clear alternative cause for diarrhoea**
I	**Isolation. Advise isolating the patient if they are a resident in a care home**
G	**Gloves and aprons must be worn for all contact with the patient and their environment**
H	**Hand washing with liquid soap and warm running water before and after each contact with the patient (and their environment if a home visit is undertaken)**
T	**Test the stool for toxin by sending a specimen immediately**

Management and Treatment

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- **Current antibiotics should be stopped, if possible, as should other drugs that might cause diarrhoea.**
- **Anti-motility agents, e.g. Imodium, should not be prescribed in acute infection.**
- **Review the need for proton pump inhibitors in people with or at high risk of *C. diff* infection (CDI).**
- **Antibiotic treatment for patients who are symptomatic with CDI should be prescribed in line with The Somerset Prescribing Formulary and NICE Guidelines July 2021**

  https://www.nice.org.uk/guidance/ng199/resources/clostridioides-difficile-infection-antimicrobial-prescribing-pdf-66142090546117
- **In mild cases of CDI, and those where the diarrhoea is settling, antibiotic treatment may not be necessary.**
- **In cases of *C. difficile* colonisation, antibiotic treatment is not usually indicated.**
- **Advice on treatment can be sought from your local Consultant Microbiologist.**

Management and Treatment

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Treatment	Antibiotic, dosage and course length
First-line antibiotic for a first episode of mild, moderate or severe C. difficile infection	Vancomycin: 125 mg orally four times a day for 10 days
Second-line antibiotic for a first episode of mild, moderate or severe C. difficile infection if vancomycin is ineffective	Fidaxomicin: 200 mg orally twice a day for 10 days
Antibiotics for C. difficile infection if first- and second-line antibiotics are ineffective	Seek specialist advice. Specialists may initially offer: Vancomycin Up to 500 mg orally four times a day for 10 days With or without Metronidazole 500 mg intravenously three times a day for 10 days
Antibiotic for a further episode of C. difficile infection within 12 weeks of symptom resolution (relapse)	Fidaxomicin 200 mg orally twice a day for 10 days
Antibiotics for a further episode of C. difficile infection more than 12 weeks after symptom resolution (recurrence)	Vancomycin: 125 mg orally four times a day for 10 days Or Fidaxomicin 200 mg orally twice a day for 10 days
Antibiotics for life-threatening C. difficile infection (also see recommendation 1.1.16)	Seek urgent specialist advice, which may include surgery. Antibiotics that specialists may initially offer are: Vancomycin Vancomycin: 500 mg orally four times a day for 10 days With Metronidazole Metronidazole: 500 mg intravenously three times a day for 10 days

Clostridioides difficile infection: antimicrobial prescribing (NG199) NICE 2021

Severity

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Severity of *C. difficile* infection	
1	Mild disease: typically <3 stools per day type 5-7 (on Bristol Stool Form Scale) and a normal white cell count (WCC)
2	Moderate disease: typically 3-5 stools per day type 5-7 and raised WCC (but <15x109/L)
3	Severe disease: WCC >15x109/L, or a temperature of >38.5C or acutely rising serum creatinine (e.g. >50% increase above baseline) or evidence of severe colitis (abdominal symptoms or radiological signs). The number of stools may be less reliable as an indicator of severity
4	Life threatening disease: includes hypotension, partial or complete ileus or toxic megacolon

Recurrence of diarrhoea following treatment

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- A further episode of C. difficile infection could either be a relapse, which is more likely to be with the same C. difficile strain, or a recurrence, which is more likely to be with a different C. difficile strain. NICE (2021) states that a relapse occurs within 12 weeks of previous symptom resolution and recurrence occurs more than 12 weeks after previous symptom resolution.

- Studies have suggested that some of these relapses are in fact reinfection due to the person reinfecting themselves from spores in their environment, hence the need for thorough cleaning and disinfection of the environment. If a patient relapses, a second course of treatment is usually indicated (IPC 2021).

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IP&C Measures

Hand hygiene

- Staff should be ‘Bare Below the Elbows’ whilst on duty.
- Alcohol handrubs do not kill spores, therefore, should **not** be used.
- Hands should be washed with liquid soap and warm running water and dried with paper towels after contact with each patient (and their environment if a home visit is undertaken, including immediately prior to leaving).

Personal protective equipment

- All staff should wear disposable gloves and aprons for all contact with the patient.
- Gloves and apron should be changed between tasks, removed in the room, disposed of as infectious waste and hands washed with liquid soap and warm running water after removing PPE.
- Gloves and apron should be worn if a home visit is undertaken to a symptomatic patient. Gloves should be removed first, then remove apron, dispose of in the patient’s household waste and wash hands thoroughly.

IP&C Measures

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Cleaning and disinfection

- *C. diff* spores can survive in the environment for months or possibly years if not adequately cleaned. If a patient who is confirmed to have *C. difficile* and has either had diarrhoea in the last 48 hours, or whilst in the Practice, the immediate environment, e.g. couch, work surfaces, toilet, should be decontaminated.
- Cleaning with detergent wipes or pH neutral detergent, e.g. Hospec, and warm water alone is **insufficient** to destroy *C. difficile* spores. Following cleaning, surfaces must be disinfected with a sporicidal product, e.g. 1,000 parts per million (ppm) chlorine-based disinfectant solution, such as Chlorclean, Actichlor plus or Milton. A fresh solution must be made up to the correct concentration every 24 hours and the solution bottle must be labelled with the date and time of mixing.
- Chlorine-based disinfectant solutions may damage soft furnishings, carpets and some equipment. A risk assessment of using such solutions on surfaces should be made and where deemed unsuitable to use, pH neutral detergent and warm water, steam cleaner or carpet cleaning machine, should be used.
- Antibacterial surface sprays, including Milton, Dettol, Flash with bleach, are **not** effective against *C. difficile* spores

IP&C Measures

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Equipment Decontamination

- Medical equipment required for patient care must be decontaminated using a sporicidal product after use on the patient.

Cleaning Equipment

- Cleaning should be undertaken using colour coded equipment in General Practice.
- Mops heads should preferably be disposable. Reusable mop heads should be laundered as manufacturers instructions after each use in an industrial validated washing machine.
- Mop buckets should be decontaminated after each use with detergent and warm water and sporicidal disinfectant, dried and stored upside down to air dry in the housekeeping/cleaners equipment store room.
- Any concerns regarding the standard of environmental cleanliness must be reported to the practice manager immediately.

- **Advice for symptomatic patients**

  Clostridium difficile - NHS (www.nhs.uk)

Referral or transfer

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- Symptomatic individuals should not be transferred within a care home or hospital setting until they have had no diarrhoea for 48 hours (Bristol Form Scale type 1-4) or their bowel habit has returned to their normal type, unless **essential** investigations or treatment is required.
- If it is necessary to transfer a patient to another health or social care provider, e.g. ambulance service, hospital, they should be informed of the patient's *C. difficile* status prior to the transfer.

HCAI Surveillance & RCA

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- HCAI surveillance is a mandatory requirement by NHSE&I & Public Health England
- Surveillance has indicated that between 2007/08 and 2012/13 rates of CDI fell rapidly.
- Since 2012/13 there has been a fluctuation around the same rate. The rapid decline in the rate of all cases of CDI has been mirrored in hospital-onset cases, except for the most recent year which saw a substantial increase in rate on the preceding year. **However, the decline in community onset cases has not been so rapid and community-onset cases now constitute 64.3% of cases** (PHE 2020).
- A total of **13,177 cases of Clostridioides difficile infection** were reported by NHS trusts in England between 1 April 2019 and 31 March 2020

If there is a significant number of cases of community-onset CDI, further investigations should be undertaken to assess whether they reflect true community-acquired infections or recent discharges from hospital. Understanding the source and causes of infection will help in targeting efforts to reduce infections (DH 2008).

HCAI Surveillance & RCA

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In April 2017, the mandatory surveillance began to capture information on whether a patient with CDI had previously been admitted to the reporting trust in the past 84 days.

CDI cases are split into the following groups:

- Hospital-onset, healthcare associated (HOHA) - Cases where the date of onset is **two or more days after the date of admission**, where date of admission is day zero and the patient was admitted to an NHS acute trust at time of specimen.
- Community-onset, healthcare associated (COHA) - Cases which are not HOHA but have previously been discharged from the reporting organisation within the **28 days** prior to specimen date.
- Community-onset, indeterminate association (COIA) - Cases which are not HOHA or COHA, but have previously been discharged from the reporting organisation within the **84 days** prior to specimen date.
- Community-onset, community associated (COCA) - Cases which are not HOHA, COHA or COIA and have had no prior admission within the **past 84 days**.

HCAI Surveillance & RCA

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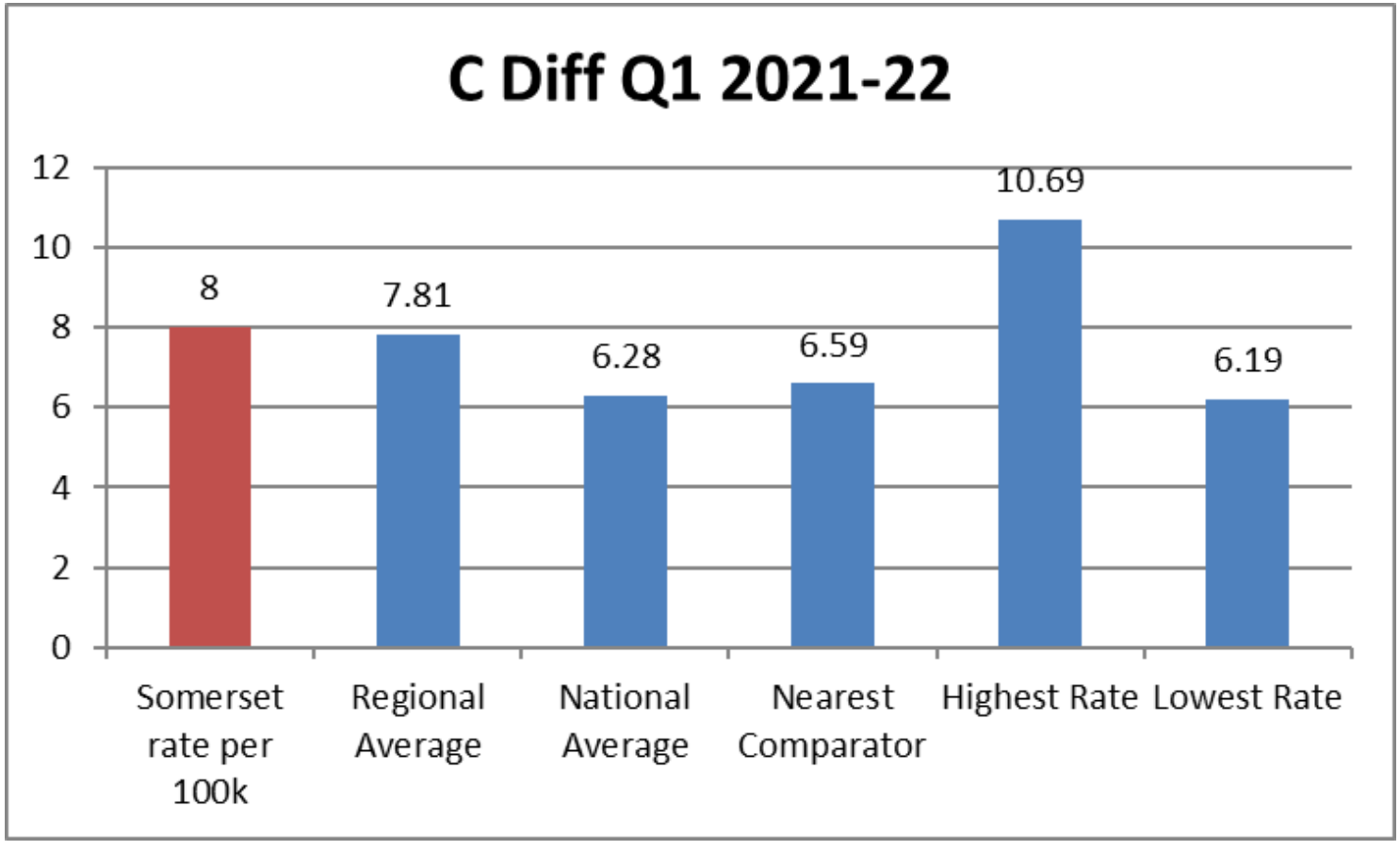
- Cases that are classed as Community-onset, community associated (COCA) cases have a Community Post Infection Review (PIR) also know as a Root Cause Analysis (RCA) which has the **purpose of identifying how a case occurred and to identify actions which would prevent reoccurrences.**

- Somerset CCG undertake Community PIR to identify any lapses in care and prescribing. General Practices will be requested to supply relevant information for the RCA investigation. **By implementing the lessons learnt from the RCA, patient safety can be continuously improved.**

- The NHS Standard Contract includes quality requirements to reduce HCAI. No official threshold was received in 2020-21 from NHSE&I but for 2021-22 the threshold for C diff received in August 2021 is 104. This is 20 cases lower than the last official threshold received for 2019-20 (124).
- **64 for primary care**, 24 SFT and 16 YDH = 104



At the end of Q1 Somerset CCG had the **3rd highest** C diff rate per 100k in the region for the quarter (8), higher than both the regional average (7.81) and national average (6.28). The 12 month rolling rate is also the 3rd highest in the region at 27.56 which is slightly lower than the regional average (27.59) but higher than the national average (23.74).

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Outcome Measures – YTD 2021-22

Totals for CCG	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YTD	Annual Threshold
MRSA BSI	3	1	1										5	Zero tolerance
C Diff	12	15	20										47	104
E. Coli BSI	34	39	32										105	492
MSSA BSI	11	16	9										36	173 *
Klebsiella BSI	5	7	11										23	127
Pseudomonas BSI	2	4	3										9	45

*** no official trajectory set, internal threshold calculated using NHSEI C diff methodology based on year end case numbers for 2019**

Patient Story……

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RCA undertaken by Somerset CCG with information supplied by the GP and Care Home

Lessons Learnt

- Original diagnosis of C diff from 24th June. After discussion with the NH manager it was understood that Mrs Vimto did not fully recover form C diff.
- Information from the GP stated that Vancomycin was prescribed again on the 2nd August. According to NICE prescribing guidance, should be prescribed Fidaxomicin 200mg PO BD for 10 days as a relapse of infection as in line with guidance this occurrence has happened within 12 weeks of original diagnosis.
- It was understood that there were no other cases in the care home. Mrs Vimto was isolated and the home increased cleaning but a deep clean was not undertaken as the condition fluctuated and loose stool continued. PPE use was not appropriate.
- **PPI could have been stopped, terminal clean undertaken at CH, PPE worn correctly and Vancomycin & Fidaxomicin prescribed appropriately.**
- **Action Plan** – Antimicrobial Pharmacist to discuss with GP, Care Home to undertake a deep clean and re train staff in correct PPE usage.

References

DOH 2008

- Clostridioides difficile infection: how to deal with the problem - GOV.UK (www.gov.uk)

NICE 2021

- Overview | Clostridioides difficile infection: antimicrobial prescribing | Guidance | NICE

InfectionPreventionControl 2021

- C. difficile (Clostridioides difficile) Policy for General Practice - Infection Prevention Control

Somerset CCG Prescribing Formulary

- https://www.somersetccg.nhs.uk/prescribing-and-medicines-management/

NHS website

- Clostridium difficile - NHS (www.nhs.uk)

Public Health England 2020

- Annual publication of epi commentary (publishing.service.gov.uk)

Public Health England

- Clostridioides difficile: guidance, data and analysis - GOV.UK (www.gov.uk)

Wilson. J (2019) Infection Control in Clinical Practice. 3rd Ed. Elsevier. London.

Questions

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