

Reducing *Clostridium difficile* infection when the HEAT is on!

Janathan Danial¹, Luke Tysall¹, Karen Macsween^{1,2,3}, Alison Cockburn³, Carol Philip³, Lindsay Guthrie^{1,2}, Linda Mulhern² and Donald Inverarity^{1,2,3}

¹ Infection Prevention and Control Team, NHS Lothian; ² Department of Medical Microbiology, NHS Lothian; ³ Antimicrobial Management Team, NHS Lothian
e-mail for correspondence janathan.danial@nhslothian.scot.nhs.uk

Introduction and Background

- ◉ *Clostridium difficile* infection (CDI) is often avoidable, easily transmissible and potentially fatal
- ◉ Increased incidence of CDI can lead to the reputational damage of affected organisations
- ◉ Scottish NHS Boards report CDI in patients aged 3 years and over to Health Protection Scotland (HPS) as defined in the current protocol⁽¹⁾
- ◉ The incidence of CDI in Scotland is openly reported by HPS and the Scottish Government
- ◉ In April 2008 the Scottish Government established healthcare quality indicator targets called *Health Improvement, Efficiency, Access and Treatment* (HEAT) one of which was CDI reduction
- ◉ HEAT Targets were rebranded as *Local Delivery Plan* (LDP) targets from April 2015
- ◉ During years ending March 2014 and 2015, NHS Lothian had a higher reported incidence of CDI compared to the rest of Scotland (figure 1)
- ◉ NHS Lothian provides a comprehensive range of healthcare for the populations of Edinburgh, East Lothian, Midlothian and West Lothian (figure 2)
- ◉ A local Enhanced CDI Surveillance Programme already existed to collate information including patients antibiotic exposures and disease severity
- ◉ NHS Lothian piloted a number of interventions aimed at reducing CDI incidence starting early 2015 (figure 4)

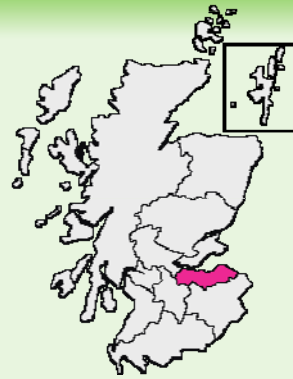
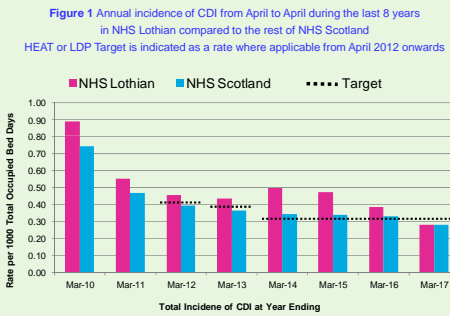


Figure 2 NHS Scotland Health Boards NHS Lothian region is highlighted

Evidence of Improvement

- ◉ Interventions led to a Board-wide reduction of CDI within 12 months
- ◉ The Scottish LDP target for all health boards is to achieve a rate of 0.32 (or less) per 1000 total occupied bed days (OBDS) by March 2017
- ◉ **NHS Lothian rate was 0.27 per 1000 OBDS by March 2017**
- ◉ A multidisciplinary and multifaceted approach to CDI has been effective at reducing the incidence of CDI in NHS Lothian
- ◉ Ongoing work by NHS Lothian Infection Service with engagement from clinical staff continues to monitor the incidence of CDI
- ◉ Provisional data shows that NHS Lothian rate for the period April – September 2017 is 0.22 per 1000 OBDS which is lower than the same period in the previous year (figure 4)

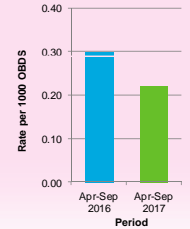
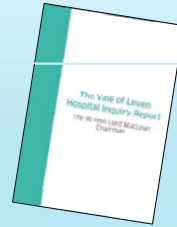


Figure 3 NHS Lothian provisional CDI incidence for Apr – Sep 2017 (green) Compared to the same period in the previous year (blue)

Interventions to Reduce *Clostridium difficile* Infection

Active Case Management by Infection Specialist

- ◉ Laboratory confirmed positive results for hospitalised patients are phoned to the clinical teams to ensure appropriate infection control precautions are in place
- ◉ Infection Specialists visit hospitalised patients to ensure optimal clinical management of patients with CDI
- ◉ Factors which may trigger toxin production are addressed and avoided when feasible
- ◉ Antimicrobial use is reviewed and optimised where required
- ◉ Aspects of overall care and relevant documentation are assessed in keeping with the recommendations of the Vale of Leven enquiry⁽²⁾



Reporting Using Surveillance Definitions

- ◉ Cases of CDI are defined according to the HPS current surveillance protocol⁽¹⁾

“A case of CDI is someone in whose stool *C. difficile* toxin has been identified at the same time as they have experienced diarrhoea not attributable to any other cause, or from whose stool *C. difficile* has been cultured at the same time as they have been diagnosed with pseudomembranous colitis (PMC)”



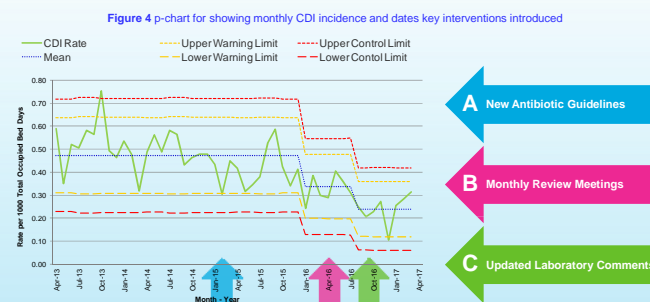
Multidisciplinary Case Reviews

- ◉ Infection Prevention and Control Team collate data from the local enhanced CDI surveillance programme including relevant medical history, antibiotic exposures, disease severity and treatment
- ◉ Data from each review is compiled into a spreadsheet for a monthly multidisciplinary case review
- ◉ Multidisciplinary team includes
 - ◉ Microbiologists
 - ◉ Nurses
 - ◉ Scientists
 - ◉ Antimicrobial Pharmacists
- ◉ Issues relating to non-optimal management of patients with CDI are documented for learning and flagged with senior clinicians



Monthly Reports and Feedback

- ◉ Statistical Process Control (SPC) charts or p-charts are incorporated into the monthly reports highlighting key interventions (figure 4)



- ◉ Outcome from the multidisciplinary case reviews are reported to Clinical Management Teams and Infection Specialists
- ◉ Issues and learning outcomes are highlighted with recommendations to aid improvement

Laboratory Interventions

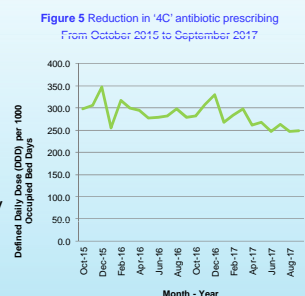
- ◉ Ensure specimens for *C. difficile* testing arrive at the laboratory promptly and are tested as soon as possible
- ◉ Empower Biomedical Scientists not to process inappropriate specimens, for example formed stools for *C. difficile*
- ◉ Results are authorised without delay using automatic authorisation rules
- ◉ Laboratory reporting comments were revised to educate staff on the significance of *C. difficile* toxin positive and equivocal results
- ◉ Direct staff where to obtain guidance on the prevention, diagnosis and management of CDI patients



Antimicrobial Prescribing

- ◉ Adult empirical prescribing guidelines were changed to discourage the use of '4C' antibiotics (clindamycin, cephalosporins, co-amoxiclav and ciprofloxacin) when feasible

- ◉ Figure 5 shows the reduction in defined daily dose of '4C' antibiotic prescribing in acute sites over time



- ◉ Antimicrobial Management Team review departmental antimicrobial treatment policies in order to diversify antimicrobial treatment options in the elderly and patients at risk of CDI

Education Awareness

- ◉ Provide general staff education including:
 - ◉ When and when not to submit specimens to test for *C. difficile* for example loose stools following treatment with laxatives
 - ◉ Further specimens to demonstrate clearance are not required
- ◉ Provide General Practice education including succinct key messages
 - ◉ Ensure the optimal CDI treatment and duration is used
 - ◉ Patients with CDI can relapse in the 12-weeks following completion of treatment
 - ◉ Treatment with antibiotics during this 12-week period should be avoided where possible
 - ◉ Avoid the use of '4C' antibiotics
 - ◉ Where antibiotics are needed, ensure the optimal choice and duration of treatment is used

References

1. Scottish Microbiology & Virology Network, Scottish *Clostridium difficile* Reference Service and Health Protection Scotland. Recommended protocol for testing for *C. difficile* and subsequent culture. Health Protection Scotland 2017
2. Vale of Leven Hospital Inquiry 2014 available from www.valeoflevenhospitalinquiry.org